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NOTES ON SOME NEW REMEDIES.

By John M. Maisch.

Chloralcyanhydrin or *Chloralhydrocyanide* was obtained in 1872 by Hagemann, and by Pinner and Bischoff, by treating chloral with anhydrous hydrocyanic acid at an elevated temperature. A ready method for preparing this compound was given by Pinner (*Berichte*, 1884 p. 1997) and consists in dissolving chloralhydrate in a 10 or 12 per cent. solution of hydrocyanic acid, obtained from potassium ferrocyanide equal in weight to that of the chloralhydrate; the solution is set aside for 24 hours, then for several hours digested using a reversed condenser and finally evaporated on the water bath. It crystallizes from water or carbon disulphide in thin white rhombic plates, melts at 61°C., boils with some decomposition between 215° and 220°, has an odor recalling that of hydrocyanic acid and chloral, and is readily soluble in water, alcohol and ether. Its composition is represented by the formulas $C_3H_2Cl_3NO$ or $CCl_3.CH(OH).CN$, and it is the nitrile of trichlorolactic acid, this acid being generated by strong hydrochloric acid. The solution in distilled water remains unchanged for some length of time, and does not produce a precipitate with silver nitrate, except after heating when AgCy is deposited. Alkalies decompose the compound, yielding chloroform, hydrocyanic acid and formic acid. The compound has been recommended as a substitute for hydrocyanic acid, of which it yields 15.5 per cent.; or 6.452 parts of chloralcyanhydrin correspond to 1 part HCy. 1.29 gm. chloralcyanhydrin dissolved in 9 gm. distilled water furnishes a solution corresponding in strength to the officinal 2 per cent. hydrocyanic acid; and a solution of 0.645 gm. in 100 gm. of water corresponds in strength to a bitter almond water with $\frac{1}{10}$ per cent. HCy. (See also Amer. Jour. Phar., 1888, p. 13.)

Sulfonal is a new hypnotic, which has been experimented with by Professor A. Kast (*Berl. klin. Wochenschr.*, 1888, No. 16), and was found to produce on animals no untoward or deleterious effects even when given in large doses. Taken by healthy persons, sulfonal has no effect or merely produces a sensation of lassitude and fatigue, and but rarely induces sleep; but in patients suffering from wakefulness from various causes, sound and quiet sleep was produced in from thirty minutes to two hours, and lasting for from five to eight hours. The medium dose is from 2 to 3 gm., but even doses of 4 gm. given at short intervals alternating with medium doses have no ill effects.

Sulfonal is prepared by E. Baumann (*Berichte d. d. Chem. Ges.*, 1886, p. 2808) by oxidizing dithioethyl-dimethyl-methane with potassium permanganate in the presence of a little acetic or sulphuric acid. It crystallizes from boiling water in colorless thick prisms or plates, is inodorous and tasteless, sparingly soluble in cold alcohol, more freely soluble in ether, chloroform and benzol, and requires about 100 parts of cold water or about 18 parts of boiling water for solution. It melts between 130° and 131° C., and boils near 300°; the yellowish distillate again yields the pure compound on recrystallization. Its composition is diethylsulfone-dimethyl-methane=$(CH_3)_2\,C\,(SO_2\,C_2\,H_5)_2$. It is not decomposed by boiling with alkalies. Hot sulphuric acid gradually decomposes it. It dissolves in concentrated sulphuric or nitric acid, and is reprecipitated on the addition of water. Its solution in bromine, on evaporation, leaves the unaltered compound.

Mercuric alaninate has been prepared by Dr. R. DeLuca (*La Riforma Medica*) by dissolving one part of alanin in 20 parts of distilled water, heating to boiling, saturating with mercuric oxide, filtering, evaporating and crystallizing. The compound is in whitish microscopic needles grouped in crosses and tufts, and soluble in three parts of water, the solution being colorless and permanent on exposure to air and light. In dilute solutions it will not coagulate albumen; in concentrated solutions its coagulating power is limited to its causing a cloudiness of that part of the liquid with which it comes immediately in contact. In other respects it has the general properties of other salts of mercury. Preliminary experiments on animals showed that the compound was not very poisonous. On his patients Dr. DeLuca used it in solutions of 4, 8 and 10 milligrams to 1 cc. of distilled water, both for internal use and for injections, subcutaneous or intermuscular. The daily quantity used on each adult patient was from 5

to 10 milligrams. The average number of days of treatment for each of the twenty patients was 37·02; average number of injections to each patient, 27·7; average age of patients, 23·2 years. All the cases were those of secondary syphilitic lesions.—*Med. Jour. and Exam.*, May, 1888, p. 305.

a OXYNAPHTOIC ACID has been recommended as a valuable disinfectant. Eller, who first prepared this compound twenty years ago, named it carbonaphtholic acid. Subsequently L. Schäffer, (*Annalen* 1869, vol. 152, p. 291), distinguished the *a* and *β* acids, of which the former is colored blue, but the latter purplish-black by ferric chloride. R. Schmitt, in 1884 (*Berichte*, 1885, Ref., p. 204) had a process patented for the manufacture of carbonaphtholic or oxynaphtoic acids, which consisted in treating sodium naphthol with carbonic acid under pressure and heating to between 120° and 140° C. Of the various compounds which may thus be obtained, the *a* acid is now prepared on a large scale and has been ascertained to possess valuable disinfectant properties. It crystallizes in colorless needles, has an odor recalling that of naphthol, is sternutatory, and when carefully heated sublimes without decomposition. It is soluble in alcohol and ether, but requires about 30,000 parts of water for solution. This solution of the pure acid remains unaltered on exposure, but that of the crude acid turns yellow and red. On boiling decomposition takes place with the production of carbonic acid and naphthol. The crude acid leaves about 0.4 per cent. of ash. Its antizymotic properties are considerably greater than those of salicylic acid. It has been found, when added to the substances named, to prevent the decomposition of blood, urine, mucilage, paste and similar articles, and to render sinks and water closets inodorous. Owing to its poisonous properties it is not adapted for the preservation of articles of food, but as a surgical antiseptic it appears to be useful, and an *oxynaphtoic collodium* has been recommended containing one-half per cent. of this compound.

Creolin is a product of the dry distillation of coal and forms a blackish brown, almost syrupy and viscous liquid, having a tar-like odor and when dropped in water, forming delicate white clouds, a single drop rendering from 250 to 300 cc. water uniformly milky and opaque. It has been employed by Dr. J. Neudoerfer (*Phar. Post*, 1888, p. 24) as an antiseptic for wounds and in several cases of erysipelas, and was usually applied by means of gauze, previously freed from fat, in the form of solution of two drops to 200 cc. water.

An examination of creolin by A. Gawalowski (*ibid.* p. 229) elicited the following: It is thickish, clear, of a dark granate red to chestnut brown color; has a vinous aromatic taste with a pungent soapy and burning after-taste, and a tarry odor; reaction neutral; spec. grav. at 17.5° C. 1.066; soluble in all proportions of absolute alcohol, also in 95 per cent. alcohol, chloroform, and in ether and acetic ether; soluble clear in 1.7 parts of 70 per cent. alcohol with more becoming turbid; partly soluble in petroleum benzin, leaving a tarry black brown residue; insoluble in wood spirit, becoming flocculent, then oily; with carbon disulphide forms a light brown emulsion and separates a tarry layer, becoming whitish-yellow and oily; with water forms a milky greenish-yellow liquid; with acidulated water yields a brownish emulsion separating a supernatant fatty layer; with alkaline water gives a dingy yellow permanent emulsion, and with glycerin likewise an emulsion separating an oily layer.

Subjected to heat creolin yielded a distillate at 100° C. amounting to 45·0 per cent.; between 100° and 147° C. 26·33 per cent. and left tarry residue 22·90 per cent. and ash 5·77 per cent. The saponifiable fat acids and resins amount to 0·30 per cent.; resin readily soluble in alcohol (possibly guaiac) 0·78 per cent.; tar bases 0·48 per cent.; tar compounds combining with alkali 61·88 per cent. The ash contains sodium with traces of potassium. The portion soluble in benzin was 72·8 per cent., and had an aromatic naphthalin-like odor. Naphthalin, fluorescein, aniline, toluidin, phenol and picric acid were determined qualitatively. According to this analysis creolin consists mainly of coal tar, with the addition of some resin soap, fat soap and caustic soda.

For the internal administration of creolin the form of mixture does not appear to be adapted; for on diffusing 0·05 gm. of it in 25 gm. of water, and adding 5 drops of this emulsion to 60 gm. of syrup of marshmallow, the syrupy mixture still had a very persistent tarry and soapy taste.

Napthol water for purulent discharges from the nostrils, is prepared by Dr. Ruault (*Arch. Laryngol*) by dissolving β naphthol 125 gm., in alcohol 88 gm., and mixing a teaspoonful of this solution with a liter of lukewarm water. The unpleasant sensation produced by the use of this liquid disappears in a short time. For intolerant patients a weaker mixture may be used, or a preliminary spray of cocaine may be employed.

LABORATORY NOTES.

Abstracts from Theses.

Commercial sugar whitened by blue pigment appears to be more frequently met with at the present time than formerly. During the spring and summer of 1887, Charles C. Stratton, Ph. G., procured at different times 17 samples of sugar, all of which were labeled "first grade granulated," the majority of the samples being the products of one refinery. Every one of these sugars was whitened with a blue pigment, the nature of which was not examined except in a few instances, when it proved to be ultramarin. For determining the amount of blue pigment, six pounds of sugar were used of each lot, except a few specially noted below. The sugar was dissolved in pure water; the syrup was set aside for 3 or 4 weeks, and then decanted from the sediment; the residue was diluted with water, mixed with alcohol, and this mixture allowed to settle, decanted and filtered, the undissolved portion being washed upon the filter, dried and weighed. The yield of blue pigment was as follows: 1., 2 grains; 2., 8 grains; 3., 10 grains; 4., 6 grains (mostly dirt; little blue); 5., 6 grains; 6., 5 grains (about one half dirt); 7., (from 25 oz.) 1¼ gr.; 8., 6 gr.; 9., (from 25 oz.) ¾ gr.; 10., 3 gr.; 11., 4 gr.; 12., 12½ gr., of which about 4 gr. was blue pigment; 13., 5½ gr. blue and 5 gr. dirt; 14., very little blue; 15., 12½ gr. nearly pure blue; largest amount observed; 16., 3½ gr., and 17., 3 gr. blue and 2 gr. dirt. Since most of the samples came from one factory, it will be seen that the coloring matter used for different lots of sugar by the same maker varies in amount, but is in all cases small and probably not injurious, though it should be considered as an adulterant.

Reference is also made by the author to a paper published in a western journal, stating that the sugars of five refineries in New York and Philadelphia, were found to be whitened with ultramarin in three cases, and with Prussian blue in two cases, while the sugar of a Brooklyn refinery had been found free from foreign coloring matter.

Assay of chocolates.—Howard M. Smith, Ph. G., examined five samples of commercial chocolate by the following process: The chocolate, using 5 gm. of each sample, was exhausted by maceration with petroleum spirit, and the liquid filtered off and evaporated spontaneously. The residue after driving off the petroleum with heat, was mixed with an equal weight of magnesium oxide, macerated for two days with 50 cc. of 80 per cent. alcohol, the mixture heated to boiling, and the liquid filtered into a tared beaker and evaporated to dry-

ness by means of a water bath. The extract was deprived of oil by petroleum spirit, and of theobromine by ether, leaving sugar behind. The exhausted chocolate was now treated with 100 cc. of water at 15° C., the filtrate evaporated, the extract redissolved in 10 cc. of water, the gum precipitated by the addition of alcohol, and an additional quantity of sugar was obtained by evaporating the filtrate. The following table gives the percentage of the ingredients:

	Oil.	Theobromine.	Gum.	Sugar.	Undissolved residue.
I.	23·52	1·3	1·64	40·74	32·8
II.	22·26	·92	1·50	28·06	47·26
III.	42·4	1·74	·34	2·36	53·16
IV.	28·48	1·52	·78	3·86	65·36
V.	31·84	1·26	·66	5·02	61·22

Nos. IV. and V. were readily suspended on being stirred in hot water or milk; and all the samples were easily diffused in these liquids by boiling for five minutes.

Comparative value of commercial gingers.—Several commercial varieties of ginger were procured by Frank M. Siggins, Ph.G., and assayed for the amount of resinous extract; 8 ounces of each sample in No. 60 powder, were exhausted by percolation with alcohol of ·820 spec. grav., the percolate was distilled until about one fluidounce remained, which was evaporated in a tared capsule by means of a water bath, until it ceased to lose weight; the results were as follows:

I. Jamaica, unbleached	5·0 per cent. resin.
II. Jamaica, bleached	4·8 " " "
III. East India	6 65 " " "
IV. East India	6·57 " " "
V. African	6·17 " " "
VI. African	7·0 " " "

These results agree with those of former investigators, showing that African and India gingers yield more resin than does Jamaica ginger, and would seem to be preferable to the latter for medicinal use. The unbleached Jamaica ginger was also treated with petroleum benzin, but this menstruum yielded only 2·62 per cent. of resinous extract.

Sodium and ammonium hydrates were tried to ascertain whether they could be used to form a good extract soluble in water; but the results were not satisfactory. By percolating the tincture of the drug through animal charcoal it may be made nearly colorless, and still retains the sharp, pungent and characteristic taste.

Potassii iodidum.—Geo. A. Curriden, Ph. G., prepared some potassium iodide in the usual manner, by treating potassium hydrate with resublimed iodine, igniting the salt with charcoal, and crystallizing twice. To this sample, marked No. 1, the pharmacopœial tests for purity were applied, and four commercial samples, procured from manufacturers in New York, Philadelphia, St. Louis and Baltimore were examined in the same manner, giving the following results:

PHARMACOPŒIAL TESTS.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
For alkali with litmus paper.	Faint blue.	Deep blue.	Violet blue.	Violet blue.	Deep blue.
For iodate.	Clear, then yellowish.	Brownish.	Purplish blue immediately	Purplish blue immediately.	Brownish.
For chloride or bromide.	Clear.	Cloudy at once	Cloudy and precipitate.	Cloudy and precipitate.	Cloudy at once.
For sulphate.	Clear.	Cloudy at once	Clear.	Clear.	Cloudy at once.
Weight of AgI.	1.415.	1.368.	1.415.	1.300.	1.400.

The precipitated silver iodide was well washed, carefully dried, brought to the fusing point in a porcelain crucible, cooled and weighed. Of the commercial samples, No. 3 alone yielded the theoretical weight. The weight of iodide procured by the remaining three commercial samples being *less*, the difference was probably due to the presence of carbonate, sulphate and iodate, the amount of which impurities was not estimated.

Hydrargyrum ammoniatum.—This compound was prepared by Wm. J. Williams, Ph.G., according to the pharmacopœial process, and corresponded with all the requirements of the pharmacopœia. This specimen was marked No. 1. Three commercial specimens were purchased, of which No. 2 alone was fusible. The pharmacopœial tests being applied to all, the following results were obtained:

Pharmacopœial tests.	No. 1.	No. 2.	No. 3.	No. 4.
Heated to redness,	Completely volatile.	2 per cent. residue, mostly Fe_2O_3.	2½ per cent. residue, mostly Fe_2O_3.	Completely volatile.
Solubility in HCl,	Soluble; no effervescence.	Soluble; no effervescence.	Soluble; no effervescence.	Soluble; slight effervescence.
Lead (solution in acetic acid tested with H_2SO_4),	Absent.	Absent.	Absent.	Absent.

ANALYSIS OF CASSIA NICTITANS, *LINNÉ.*

By Charles S. Gallaher, Ph. G.

From an Inaugural Essay.

This plant is known as wild sensitive plant, and grows abundantly in the neighborhood of Philadelphia where it was collected for analysis, then dried and reduced to powder No. 80. The air-dry powder on being heated to between 100° and 110° C., lost 3.7 per cent. of moisture, and yielded 4.8 per cent. of ash.

Petroleum benzin extracted a minute quantity of volatile oil, and 0.08 per cent. of waxy matter melting at 58° C. Ether took up from the powder 5.6 per cent. of resinous matter and chlorophyll, tests for glucosides and alkaloids giving negative results. The alcoholic extract on being treated with water, left 5.78 per cent. of resinous matter undissolved; the aqueous solution yielded nothing to petroleum spirit, benzol and chloroform; tested with gelatin and ferric salt, the presence of tannin was revealed and this was estimated by precipitation with copper acetate and ignition, the result being 7.44 per cent. of tannin. The aqueous extract weighed 17.28 per cent.; this was found to be free from glucose, but contained another sugar, dextrin, and gum; cathartic acid could not be prepared from it, but the powder was ascertained to have a laxative effect and to produce griping. Tests applied for starch gave negative results; albumin, pararabin, calcium oxalate, lignin and cellulose were present.

A larger quantity of the fresh plant was distilled with water in the presence of lime, but no volatile alkaloid was obtained. Another portion distilled with dilute sulphuric acid yielded a distillate having merely a faint acid reaction.

ELIXIR OF THEINE HYDROBROMATE.

By Joseph W. England, Ph.G.

Read at the Pharmaceutical Meeting, May 15.

As a remedy in the treatment of certain nervous affections, the alkaloid theine or caffeine, seems to be rapidly growing in medical favor and use.

Although as early as 1838, Mulder and Jobst found that theine and caffeine were chemically identical, it is yet a mooted question, but the burden of evidence seems greatest in favor of that assumption.

Meanwhile, manufacturers frankly say that they make both their theine and caffeine from tea leaves, and if theine is called for they give theine, or if caffeine is desired, they give the same, so that it is safe to assert that many of the statements made concerning the superiority of one of the alkaloids over the other, are open to serious question, unless the true source of the alkaloid used is known.

Hypodermically, theine has been highly lauded in the treatment of rheumatic and other troubles, especially by Dr. Thos. J. Mays, of this city, who strongly urges the use of a hypodermic solution of theine, somewhat analogous in composition to Tanret's, but containing, in addition, sodium chloride. As this solution may not be generally known among pharmacists, its formula may be of value. It is as follows: Triturate theine, 64 grains, with sodium benzoate, 60 grains, and sodium chloride, 10 grains; adding sufficient distilled water to measure, after filtration, one fluidounce. Filter. Every five minims contain two-thirds of a grain of theine. Dose, five to fifteen minims.

Of the various salts of caffeine, or theine more correctly, found in commerce, the so-called citrate is the one most largely used, then follows the alkaloid, and then in minor quantities, the benzoate, nitrate, hydrochlorate, valerianate, salicylate, sulphate, tannate and hydrobromate.

In regard to the salts of caffeine or theine, Gmelin[1] states that caffeine forms with H_2SO_4 an acid and a normal salt, which dissolve more easily in water than in alcohol, but which solutions evaporated, precipitate out the alkaloid and not the sulphates; with HCl caffeine forms a hydrochlorate which, on the addition of water or alcohol, crystallizes out a considerable quantity of hydrated caffeine; with HNO_3 there is formed a definite compound, which solution, on evaporation, similarly precipitates its combined caffeine.

Likewise, in regard to the solution of the hydrobromate, the writer has found that if it be evaporated, almost all the caffeine will be precipitated out, letting free the combined hydrobromic acid.

These statements would indicate then, that the chemical affinity between the alkaloid and the acid is but a feeble one at best, and that a solution made from the two is far better than a solution made direct from the ordinary commercial salt.

E. Merck of Darmstadt, in his April bulletin calls them all true

[1] Gmelin, (Cavendish edit.) vol. 13, p. 232.

salts, but there seems to be very good grounds for believing on the authority of Günther, and latterly, Hager and Haakman, that the citrate and valerianate as obtained in commerce are simply mixtures of the alkaloid with adhering citric or valerianic acid. Indeed, it is not long ago, the writer has been informed, that Dr. Hager, recognizing this fact, advised pharmacists to mix one-third citric acid with two-thirds theine, whenever their customers wished theine or caffeine citrate. Probably, Merck solved the difficulties in the way of its making, but as yet, the process has not become public.

Of all the possible salts of theine—the term is here used synonymously with caffeine—the hydrobromate would seem to be the one whose chemical character would most consistently give the best therapeutical action. The sedative alkaloid theine, being in combination with the sedative hydrobromic acid, the action of theine hydrobromate should be doubly happy. True the percentage of the acid is small, but, all things equal, it should, theoretically, be the best.

Reasoning on this basis, the writer constructed an elixir of theine hydrobromate, which was tried medicinally, and the results obtained would seem to justify the highest expectations formed in regard to it. The formula used is as follows:

Take of:

Theine	℥iss
Dilute Hydrobromic Acid	f℥i
Water	f℥i
Elixir of Orange	q. s. ad oi.

Dissolve the theine in the water and hyrobromic acid, with the aid of heat, filter and add the orange elixir. Dose: 1 to 3 teaspoonfuls. The product is a clear, transparent, water-white liquid; pleasantly bitter in taste; almost neutral in reaction, miscible with an equal volume of alcohol without precipitation. Each teaspoonful contains one grain of anhydrous theine hydrobromate (C_8 H_{10} N_4 O_2 HBr).

Absorption of Lead Chromate—Experiments made on animals with the pure salt, have led Dr. John Marshall to the following conclusions:—1. Absorption of lead and chromium takes place upon administration of lead chromate. 2. Owing to the insoluble nature of the salt, absorption takes place very slowly. 3. It is most likely that the absorption of lead takes place in the stomach and not in the intestinal tract. 4. The chromium of the decomposed lead chromate would be absorbed in the stomach as chromic chloride, and in the intestines assodium chromate. *Therap. Gazette*, Feb. 1888.

SHOULD FORMULÆ FOR THE POPULAR ELIXIRS BE INCORPORATED IN THE PHARMACOPŒIA?

By Geo. M. Beringer, Ph.G.

Read at the Pharmaceutical Meeting, May 15.

As the time for the next decennial revision of the national standard approaches, it becomes of material importance that pharmacists throughout the country should take note of those preparations, the use of which is increasing, and of those, the use of which is declining or which are not used at all. It is intended that the Pharmacopœia should be the authority for all medical preparations of frequent use and comparatively few of the officinal preparations are more frequently prescribed than some of the elixirs. In a decade, there occur so many changes in medicinal usage that it becomes necessary to omit some of the officinal preparations and others must be added. It is not only a subject of interest, but probably a duty, that desirable changes should be discussed by pharmaceutical bodies. This is my only excuse for introducing the subject here. It is the hope of the writer that the next revision will result in a practical work which will be not only the official standard, but will be universally adopted by the pharmacists of America.

In the last revision the committee took a step in the right direction in adopting a formula for elixir aurantii or simple elixir, and also in making vinum ferri amarum officinal. The elixirs, as a class, were looked upon as semi-proprietary preparations, introduced by manufacturers to meet the popular demand for elegant preparations, the popularizing of which it was not thought desirable to promote. Elegant pharmacy and elegant preparations should not be confined to the laboratory of the manufacturer; but in the store, behind the prescription counter, in the work of each individual pharmacist, should we see it illustrated.

But one small concession was made, namely, the introduction of a simple elixir which might be used as a base for the various preparations. While I do not care here to criticize that formula I can safely say that no manufacturer or pharmacist would expect to successfully use the same liquid to disguise alike saline, bitter and astringent substances. Again, in the preparation of the popular elixir of iron, quinine and strychnia, and similar preparations, the flavoring ingredients have to be added in the course of the manipulation.

Since this revision, the use of elixirs has steadily continued, sub-

ject, of course, to such variations in use as we meet in fluid extracts, tinctures, syrups, etc., and to such restrictions as are due to locality, prejudice and that growing "fashion in medicine."

Thinking that it might not be entirely without value, I have made a computation as to the proportion of prescriptions containing some representative of this class and also the frequency of use of each. These data were obtained by examining one thousand prescriptions for each of the years 1884 to 1888 inclusive. The results I have tabulated as follows:

ELIXIRS.	1884. 1,000 R.	1885. 1,000 R.	1886. 1,000 R.	1887. 1,000 R.	1888. 1,000 R.	Total. 5,000 prescriptions.
Elixir Aurantii	7	8	10	15	15	55
" Ammon. valer	3	1	1	1	1	7
" Bismuth	.....	1	1	1	.....	3
" Cascara	.....	1	1	1	2	5
" Cathartic	1	.....	.....	.....	.....	1
" Cinchona	23	13	12	8	10	66
" Cinchona and iron	4	7	2	4	2	19
" Cinchona, iron and strychnia	1	1	.....	.....	.....	2
" Cinchona, iron and bismuth	.....	1	.....	.....	.....	1
Curacoa	2	5	1	2	2	12
Elixir Eucalyptus comp	.....	.....	.....	.....	1	1
" Gentian	2	.....	.....	1	.....	3
" Gentian and Tr. iron	1	.....	1	.....	.....	2
" Glycyrrhiza arom	1	2	.....	1	.....	4
" Guarana	1	.....	1	1	1	4
" Ferri	.....	1	.....	.....	.....	1
" Ferri, quiniæ et strychniæ	4	6	13	9	8	40
" Lactopeptin	.....	1	2	3	.....	6
" Lithium bromide	1	.....	.....	.....	.....	1
" Pepsin	1	1	.....	1	1	4
" Pepsin and bismuth	.....	1	.....	1	1	3
" Pepsin, bismuth and strych	.....	.....	.....	.....	1	1
" Phosphorus comp	.....	.....	.....	1	.....	1
" Potassium bromide	.....	2	1	1	.....	4
" Rubrum	.....	.....	.....	1	2	3
" Taraxacum comp	.....	1	2	2	.....	5
" Viburnum prunifolium	.....	1	.....	.....	.....	1
" Avena sat. (prop.)	1	.....	.....	.....	.....	1
" Hydrastis comp. (prop.)	1	.....	.....	.....	.....	1
Total	54	54	48	54	47	257
Number of physicians prescribing above elixirs	39	40	37	37	24	

Mr. W. L. Turner of Philadelphia in his analysis of 1,000 prescriptions (see Proceedings Penn. State Pharm. Assoc., 1886) reports 59 prescriptions containing elixirs, the most frequently used being the elixir of iron, quinine and strychnia 16 times and elixir of cinchona 17 times. He likewise compares his figures with those given by Dr. Eccles for San Francisco and Brooklyn. I abstract as follows:

	San Francisco,	Brooklyn,	Phila.,
Elixirs in 1,000 R	54	108	59
Elixir calisaya "	37	29	17

The figures given by Mr. Turner, tally very closely with my own observations, and indicate that elixirs are not of local use only, but are used more or less throughout the entire country.

In connection with this subject, it is worth mentioning that the popularity of elixirs seems to be extending to foreign countries. The Pharmacopœia Germanica, 1882, contains formulæ for elixir amarum, elixir aurantiorum compositum, and elixir e succo liquiritiæ.[1] The Pharmacopœia Belgica, 1885, formulæ for elixirium cocæ, elixirium Gari and elixirium Stoughton. The Farmacopea Mexicana, 1884, has formulæ for five elixirs. The Farmacopea Italiana, 1887, contains formulæ for 55 elixirs, among them being elisir china china, elisir di citrolattato di ferro, elisir di coca di Fournier, elisir di pepsina di Mialhe.

There being no officinal formulae for elixirs every manufacturer and every pharmacist has his own ideas as to how they should be made. Under the present conditions a physician prescribing elixir cinchonæ may obtain from the druggist a preparation containing 1, 2 or 5 grains of alkaloids of cinchona to each fluidounce. A prescription for elixir of iron, quinine and strychnia may be compounded with a preparation containing 2 grs., 4 grs., or 8 grs. of quinine to the fluidounce; strychnia $\frac{1}{40}$ gr., $\frac{1}{80}$ gr. or $\frac{1}{100}$ gr. to the teaspoonful. His elixir of pepsin may be 2 grs., 3 grs. or 5 grs. to the teaspoonful; while his elixir of guarana may vary from 10 grs. of guarana to 80 grs. to the fluidounce. The various preparations sold vary as much in appearance as in strength. That from such a variety of preparations of vary-

[1] These three elixirs and several of those following have been used in Europe for a century or more. Several dozen formulas for elixirs—however differing in their nature from those now in use here—were published sixty years ago in the Universal Pharmacopœia, edited by A. J. L. JOURDAN, and subsequently a larger number in GEIGER's Universal Pharmacopœia, edited by FR. MOHR —Editor Am. Jour. Phar.

ing strengths the physician must obtain results deprived of certainty and uniformity is evident. The writer has not unfrequently heard it said by a customer for whom a prescription containing some elixir had been compounded, "this medicine tastes different from what Mr. Jones, or Mr. Smith compounded for the same."

That the necessity of adopting uniform formulæ is becoming appreciated is evident from the fact that a committee has been appointed to prepare a national unofficinal formulary, and have now nearly completed their labors. I do not wish to detract one iota from the value of their work, but I submit it as an open question, Is it desirable to have a middle party, or go-between, in preparations which rank in frequency of use and importance with fluid-extracts, tinctures and syrups? There should be but one authority, and that authority should be the national standard.

That the Pharmacopœia should permit uncertainty to longer exist, in preparations contained in from 5 to 10 per cent. of the prescriptions compounded, seems hardly possible. It would indicate that the committee on revision were attempting to blindfold themselves to the onward march of pharmacy.

The elixirs, as a class, have come to stay, and the time is ripe for the next Pharmacopœia to stamp its insignia of authority upon those preparations which are daily prescribed.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for The American Journal of Pharmacy.

Incompatibility of Chloral and Cyanide of Potassium. A pharmacian while preparing an ointment of chloral and potassium cyanide āā 10 gm. and lard 30 gm., found on mixing the first two substances, a reaction which sent them flying from the mortar. Blarez and Denigès in investigating the cause did not meet with so violent a reaction, but found changes which led them to the following conclusions: In preparing solutions of chloral and cyanide, the substances should be dissolved separately. This method adds also to the stability of the preparation, especially if the quantity of liquid used be large enough to lessen the chances of decomposition. But the authors think that physicians should abstain from associating chloral with potassium cyanide, the mixtures being really incompatible. As to the ointments, immediate reaction may be prevented by triturat-

ing the substances separately with the excipient. But the mixture turns brown in a few minutes, with disengagement of hydrocyanic acid. Unguents of this nature should be rejected absolutely from therapeutic uses. *Bul. de la Soc. de ph. de Bordeaux; Arch. de phar.*, May 5, 1888.

CYANIDE OF MERCURY. Stellden, a Swedish doctor has used the following formula in 1400 cases of diphtheria (since the year 1882), and claims that the number of deaths has been only 69, or less than 5 per cent., while the mortality in the same district had been over 92 per cent.; Cyanide of mercury, 0.02 gm.; tinct. aconite, 2 gm.; honey, 50 gm.; mix. Dose, a teaspoonful every 15, 30 or 60 minutes according to the age of the patient. The throat should not be scraped, but a gargle of cyanide of mercury of 1 to 10.000 aq. menth. should be used every 15 minutes. The frequent small doses create, according to the author, a medium in which the diphtheritic bacillus cannot live. *L'Union phar.*, April, 1888.

COMMERCIAL GLUCOSE IN ITALY. Alessandri of the Pavia University analyzed six samples and gives the average of his results as follows: Water 15.216; chloride of calcium, 6.436; pure glucose, 56.764; foreign organic matter, 21.314; insoluble mineral matter and loss, .270 = 100.000. He suggests that a law be passed compelling the use of sulphuric instead of hydrochloric acid in effecting saccharification. *Boll. farm.; Répert. de phar.*, April, 1888.

SUGARS OF HESPERIDIN AND NARINGIN.—Mr. Will in a communication to the *Société Chimique*, says: In heating hesperidin or naringin with dilute sulphuric acid we obtain insoluble products which are identical. The first gives the phloroglucinic ether of paraoxycinnamic acid and the second that of oxypara-methoxy-cinnamic. As to the soluble products remaining in the water, they were supposed to be different, the sugar of hesperidin being considered as glucose, and that of naringin being regarded as isodulcit. The syrup obtained from hesperidin is not pure; we only verify the existence of the glucose by reduction and fermentation. But the syrup of naringin gives the same reactions and the extraction of isodulcit from this product is difficult to effect. The author has succeeded in isolating isodulcit from the syrup of hesperidin. He used Fischer's process, treating the syrup with phenylhydrazine. A composite mixture of isodulcitic acid and phenylglucosazone was produced, which was separated

by hot acetone, in which the latter is insoluble. Thus, the author concludes that the saccharine matters of hesperidin and naringin are identical.—*J. de Ph. et de Chimie,* March 15, 1888.

"A Complete Aliment."—Adrian proposes a powder as follows, which is intended to replace the meat-powders in common use for weak and convalescent patients: Powdered roast beef, 200; powdered broiled bread (previously saturated with meat juice), 200; powdered vegetables, 200; sugar of milk, 150; tapioca, 150; dextrin, 50; malt, 50;=1000. One part of the powder represents five parts of the substances when fresh. The preparation is made in a granulated form and is readily miscible with soups, etc.—*J. de Ph. et de Chim.*, April 1, 1888.

Falsifications in Powdered Saffron.—Rietsch and Cornil (*J. de Ph. et de Chim.*, March 15, 1888), examined 79 samples of this substance and found that 49 of them were adulterated. Of these, 31 contained florets of carthamus; 4 contained santalum rubrum; 1 was adulterated with curcuma domestica, and 1 was fortified with oil; 5 contained red woods and petals not determined. Seven were double falsifications, of which 4 contained carthamus with santalum or other red woods and a red flower with an admixture of oil. Red woods and amylaceous matters were also found.

Binitrocreosol and other Colorants to replace Saffron.—The use of binitrocreosol in alimentary substances has been prohibited in Germany. Weyl (*An. di Ch. e di Farm.*) states that this product produces toxic symptoms in doses of 25 cgm. per kilo of the person who ingests it. The symptoms are tetanic spasm, pupilar rigidity, difficulty of respiration and, in animals, death in 20 to 30 minutes. As commercial binitrocreosol contains about 40 per cent. of ammonia the toxic energy of the pure substance is correspondingly great. The amount necessary for coloring butter, margarin, conserves or liquors is very small; but the writer thinks that small quantities will give rise to toxic conditions of a chronic nature. The pure "Martius Yellow" used as a lime or ammonia salt is inoffensive. The "butter yellow" discovered by Griess, may be easily substituted for binitrocreosol and does not enter into the category of poisons. Weyl describes it as "a combination of the diazotic derivative of aniline and of dimethylaniline."—*Répert. de phar.*, April, 1888.

To Pulverize Boracic Acid.—The acid is placed in a vessel with a sufficient quantity of boiling water to dissolve it. The mixture is then vigorously agitated with an egg-beater until it cools, when it gives a deposit of microscopical crystals. These are *partially* dried between sheets of filtering paper and may then be quickly reduced to impalpable powder in the mortar. The quantity remaining in solution —which is very small—may be regained by evaporation, or the same liquid may be used again for the same purpose.—*Le monde pharm.*, May 5, 1888.

Potassium Bichromate in Glue.—It is well-known that bichromate renders glue and gluten insoluble, whence its value in the sizing of various fabrics. The *Revue Scientifique* gives the proportions at 1 of bichromate to 50 of the glue mixture; the bichromate should be added just before using.

Uses of the Iodophenols.—According to the *Moniteur Scientifique*, these new colorants will have an important application in dyeing, their blue and violet tints being remarkable for durability, while the cost is very low. The process of dyeing with blue iodophenol is very simple and differs but little from that with indigo. The reductive product of iodophenol is prepared by diffusing the blue iodophenol paste in alkaline liquor with glucose, and heating to 80° [176° F.]. The mixture takes a greenish hue and has a striated appearance with bronze reflexes on its surface. The liquor is then diluted with warm water, when the cotton fabric is dipped. When the proper shade of color is obtained the fabric is pressed and exposed to the air, or to an oxidizing bath; the latter is best made with an ammoniacal solution of a cupric salt.

Artificial Rubies.—Frémy and Verneuil (*Acad. de Sci.*, Feb. 27, 1888), report important improvements in their product. The process as announced a year ago, consisted in the reaction at high temperature of barium fluoride upon alumina containing traces of bichromate of potassium. The crystals were lamellated and friable. By recent changes in manipulation, hard and regularly formed crystals are obtained, perfectly transparent and of great brilliancy. Mr. Des Cloizeaux, the mineralogist stated to the Academy that these crystals were identical with those of naturally formed rubies. The authors will continue their experiments on a more extended scale.—*Monit. Sci.*, April, 1888.

METHODS FOR DEFINITELY PROVING THE PRESENCE OF COTTON OIL OR OF OIL OF SESAME IN OLIVE OIL[1].

By M. Milliau.

The author has applied Becchi's test (*Amer. Jour. Phar.*, 1887, p. 280), based upon the reducing action of cotton oil upon argentic nitrate, but he finds that some varieties of the pure olive oil give a slight reduction, owing to certain causes which he points out. If, however, the fatty acids be first separated and the test be then applied to them, the acids from pure olive oil give no reduction, while those from cotton oil always reduce the silver. On this assumption he has based the following process:—Place 15 cc. of the oil into a porcelain basin and warm it up to 110° C. Make a mixture of 15 cc. of a solution of sodium hydrate (40 degrees Baumé) with 15 cc. of alcohol of 92 degrees, and add this solution very gradually to the heated oil, taking care that the temperature is maintained during the process. When a homogeneous mass has been obtained, distilled water is added drop by drop, so as not to cool the paste or to form clots, and this is continued until 500 cc. of water have been introduced. The whole having been boiled for a few minutes, dilute sulphuric acid (1 in 10) is added, so as to produce a slight excess of acidity and the fatty acids are thus obtained floating on the surface. The author does not seem to consider it necessary to wash these acids, but he simply removes about 5 cc. by means of a silver spoon, and puts this amount of the separated acids into a test tube with 20 cc. of alcohol, and warms until dissolved. To this liquid he adds 2 cc. of a 30 per cent. solution of argentic nitrate, and heats the whole on the water bath until about one-third of the fluid is evaporated off, when the test is complete. If the olive oil be pure, the fatty acids remain unaltered, but if cotton oil be present the acids float to the surface as a black paste. By this method the author has easily detected a one per cent. adulteration.

For Sesame Oil.—To recognize the presence of this oil in olive oil, the author finds that Baudouin's reagent is the best, but here also a pure oil may be unjustly condemned when working on the oil itself. If, however, the separation of the fatty acids be first carried out, the results are accurate. In this case, after saponification and separation of the acids, they must be perfectly dried at 110° C. They are then put into a tube and shaken up with Baudouin's reagent (hydrochloric acid and sugar), when the characteristic red color will be produced.

[1] *Arch. de Pharm.*, 3, 161. Reprinted from *The Analyst*, May, 1888, p. 95.

THE ACTION OF FINELY DIVIDED METALS ON SOLUTIONS OF FERRIC SALTS, AND A RAPID METHOD FOR THE TITRATION OF THE LATTER.

By DOUGLAS J. CARNEGIE, B.A., Demonstrator in Chemistry, Gonville and Caius College.

1. It is universally admitted in text-books that of existing methods for converting ferric salts into ferrous salts prior to titration with potassium permanganate, the safest and best, though by far the slowest, method is to boil the acidified ferric solution with zinc in an inert atmosphere. The more rapid methods (excluding the stannous chloride method, which is not applicable if permanganate titration be employed) are hampered by the facts that in their employment it is difficult to determine the point of exact reduction, and excess of the reducing agent is as fatal as defect.

It seemed to me that the safest method might be so modified as at the same time to make it a rapid one, by increasing the effective surface of the zinc through the employment of zinc-dust in the place of the usual granulated zinc. While experimenting in this direction, I found that zinc-dust *instantly* reduces ferric to ferrous salt, *and this even in neutral solutions.* At the same time, if the solution is neutral, iron is precipitated partly as ferrous, partly as ferric hydroxide. In acid solutions, no iron is precipitated, but the reduction is less rapid the more free acid there is present. In every case zinc goes into solution.

2. Very rapid and accurate estimations of ferric solutions are realized by the following method:

The bottom of a dry and narrow beaker is covered with zinc-dust, which has been sifted through fine muslin. A known volume of ferric solution, previously nearly neutralized by ammonia, is now delivered into the beaker, and shaken briskly with the zinc-dust. Finally, a known volume of dilute sulphuric acid is added, and the contents of the beaker are once more shaken. It is essential for rapid reduction that the above order be observed; the nearly neutral ferric solution must *first* be added to the zinc, *then* the acid. In order to withdraw for titration a definite volume of the ferrous solution free from particles of undissolved zinc, I make use of the "reversed filter."*

* A glass tube, one end of which is covered, first with muslin, then with filter paper, held in position by an india-rubber ring.

When this filter is immersed in the beaker, the clear ferrous solution rises in it to the same level as the liquid in the beaker, and may then be withdrawn by a pipette. The object of the muslin is to prevent rupture of the filter-paper by the narrow end of the pipette. A titration which formerly demanded an hour or more can be executed by this method in three or four minutes with an accuracy deducible from a comparison of the following numbers selected at random from a series of titrations in which no especial refinements were employed:

25 cc. of an acidulated ferric chloride solution reduced by iron-free magnesium required 15·3 cc. of a decinormal permanganate solution.	25 cc. of same solution reduced as above required 15·2 cc. of same permanganate solution.

If one is to judge from Aldendorff's analysis of a typical specimen of zinc-dust (Frémy's *Encyclopédie*), this substance is usually free from iron. The specimen with which I worked contained only 0·08 per cent. of iron, or rather reducing substance equivalent to 0·08 per cent. iron.

3. As to the nature of the reaction between zinc-dust and neutral ferric chloride, I was at first inclined to ascribe the efficacy of the dust in this respect to the occluded hydrogen which, as Greville Williams has shown, is always contained therein. I was all the more strengthened in this view by experiments which showed that hydrogen occluded by palladium quickly reduces ferric chloride in solution. It is interesting in this connection, coupled with the experiments of Gladstone and Tribe, to note that hydrogen occluded by platinum has no action on ferric salts.

To put this hypothesis to the proof, I heated some of the zinc-dust in a Sprengel vacuum till all the hydrogen was given off; I then tried the action of the volatilized zinc crystals on ferric chloride. Their reducing power was unimpaired; hence I had to seek for a new explanation.

It is well known that ferric chloride in aqueous solution is in a state of partial dissociation, as is roughly represented in the equation—

$$Fe_2Cl_6 + (n + 3)\,H_2O \rightleftarrows (Fe_2O_3 nH_2O) + Fe_2Cl + 6HCl.$$

It might be urged that on adding zinc-dust to such a system, the hydrochloric acid would be removed from the sphere of action, with formation of zinc chloride and hydrogen, and that the nascent hydrogen would reduce the ferric chloride existing as such, while the soluble hydrated iron oxide might in virtue of this upsetting of the mo-

bile equilibrium be simultaneously transformed into an insoluble hydrated form. According to this explanation it would follow that more iron hydroxide would be precipitated the higher the temperature at which reduction takes place, for the dissociation of ferric chloride increases with the temperature. And, indeed, experiment proved that about twice as much iron is precipitated as insoluble hydroxide when the reduction is effected at 100° as when it takes place at ordinary temperatures. But according to this explanation, one would predict the improbability of reduction if absolute alcohol were substituted for water as the medium of the change; whereas experiment shows that even under these conditions reduction readily takes place with great rise of temperature.

4. I am thus driven to the conclusion that the zinc acts merely as a dechlorinating agent, much as stannous chloride acts—$Fe_2Cl_6 + Zn = ZnCl_2 + Fe_2Cl_4$, and that the precipitate of iron hydroxides which occurs in neutral solutions is partly due to the zinc oxide which is always present in the dust to the extent of about 50 per cent., partly to the zinc hydroxide formed during the reduction by the action of water on the finely divided zinc. Zinc-dust merely effects instantaneously the dechlorination which I found zinc-foil required several hours to effect.

The change represented above is an exothermic one; the heat of formation in aqueous solution of $ZnCl_2$ [112,840] is greater than the negative thermal change in the passage from the system Fe_2Cl_6,Aq to the system Fe_2Cl_4,Aq [55,540].

5. If this explanation of direct dechlorination be valid, it seemed probable that all those metals whose chlorides have a heat of formation in aqueous solution greater than 55,540 gram-units would, in the finely-divided state, reduce ferric solutions. I have made many experiments in this direction, and I find that the following metals in a finely-divided state reduce ferric solutions with varying degrees of rapidity:—iron, mercury, silver, aluminium, and copper, as well as zinc. Sometimes the metals were employed in the shape of foil [aluminium, copper silver], sometimes in the state of fine division in which they are precipitated from boiling alkaline solutions of their formates, or from hot solutions of any of their salts by means of zinc-dust, followed by repeated digestion with dilute acids suited to the occasion. In the cases of aluminium and silver, it was definitely proved that no precipitation of a salt of iron occurred. This, without doubt, would

be the case with all metals M″ where $M'' + H_2O = M''O + H_2$ represents an endothermic change. Platinum and gold do not reduce ferric solutions. Now, with the exception of the last two named, the heats of formation of the chlorides of all the foregoing metals are greater than 55,540. Nevertheless, the *rapidity* of reduction by a metal does not appear to be a function of the energy which runs down in the formation of its chloride, thus $[Al^2, Cl^6, Aq] = 475{,}650$, whilst $[Zn, Cl^2, Aq] =$ only 112,840; yet zinc reduces instantaneously, whilst aluminium reduces the most slowly of all the metals experimented with. But experiment showed it to be undoubtedly the case that those metals reduce the quickest which are the most readily attacked at ordinary temperatures by dilute chlorine-water. It is of interest to note that galena in a finely-divided state also reduces ferric chloride solution, whereas antimony sulphide has not this power.

6. From the whole of my experiments, I conclude that zinc-dust is practically the best reducing agent for the purpose in hand. True it is that zinc-dust may sometimes contain a little iron, and that titration with permanganate cannot be conducted in an acid solution containing zinc, but that the latter must be first removed. But, in the first place, zinc-dust contains so little iron, and so slight a solution of zinc takes place before titration by my method, that any error arising from this source is negligible. However, in the attempt to elaborate a method which would preclude *any* uncertainty on this point, I prepared zinc-dust free from zinc oxide, as recommended by Sabatier, by means of repeated digestion with dilute acid, and also by what I found to be a more rapid method, *viz.*, by digestion with solutions of ammonium chloride and ammonia, in both cases finally drying the product on porous tiles in a vacuum. This purified zinc was shaken up with a standard ferric chloride solution *without the addition of any acid;* the ferrous solution was filtered off, acidified, and titrated; but the iron was not fully accounted for in the filtrate, so rapidly does water attack the finely-divided zinc with formation of hydrogen and zinc hydroxide; the latter precipitating solutions of iron salts in contact with it. In fact, in solutions of several metallic salts, $MgCl_2$, $Al_2(SO_4)_3$, $Co(NO_3,)_2$, $MnSO_4$, etc., finely-divided zinc very soon causes a precipitate either of the hydroxides or of basic salts of the metals present.

In the second place, even when the reduction is effected by metals

which can easily be obtained absolutely free from iron, which are not oxidized by water, and which do not evolve hydrogen with dilute acids, separation from the finely-divided metal *must* always precede titration; for even silver and aluminium are attacked in feebly acid solutions by permanganate.

7. Mitscherlich (*Zeit. anal. Chem.*, II, 72) has stated that in the reduction of ferric solutions it is absolutely necessary that the whole of the zinc should be dissolved before titration; the reason adduced being that iron is precipitated on the surface of the zinc, and does not dissolve until the last traces of the zinc themselves disappear. If this statement be accurate, objection may be taken to my method detailed above; but I much doubt its accuracy. Experiment showed that the titre of an acidulated iron solution was independent of the time it had remained in contact with the zinc-dust. This might be explained in this special case by supposing the finely divided zinc to be practically enveloped in a protecting layer of hydrogen, but other experiments would lead me to believe that such a supposition is unnecessary. Examination of pieces of granulated zinc free from iron removed either before or after complete reduction of both hot and cold ferric solutions, always failed to give evidence of iron. Beebe's method of reducing ferric solutions (*Chem.. News*, LIII, 269) would also be untrustworthy were Mitscherlich's statements correct. Without doubt the zinc in all cases becomes coated with a black deposit, which as Rodwell, Vogel, and others have shown, contains *in addition to the iron present originally in the impure zinc itself*, zinc combined with lead, sulphur and carbon.

8. After the work of which this paper is a short account was finished, I casually came across a reference in Frémy's *Encyclopédie* to a paper by Brown, on the reduction of ferric compounds by zinc. I have procured the paper referred to (*Iron*, 1878, 361), and find that Brown's method consists in reducing iron ores directly by fusion with *pulverized* zinc (Hobson and Sylvester had shown that at a temperature of 205° zinc becomes so brittle that it may be powdered in a mortar). Brown has also used this pulverized zinc to reduce ferric salts in acid solutions; but that his method is founded, as is the current one, on the reducing action of nascent hydrogen, and not on the direct reducing powers of the zinc, is obvious from the following quotation:—"There should be but a very small excess of sulphuric acid present, so that at the *end of an hour or two* only about half the zinc will be dissolved."

Brown is also of opinion that the whole of the zinc must be dissolved before titration, but he does not state his grounds for that opinion.

I prepared some pulverized zinc, by Hobson and Sylvester's method, but with three different specimens of zinc. I uniformly found that they did not become brittle at 205° but at higher temperatures, and also that it was impossible thus to obtain anything approaching the fine division of zinc-dust. The pulverized zinc obtained reduced neutral ferric solutions but slowly.

In conclusion, I would express my thanks to Mr. Pattison Muir for the kindly suggestive interest he has taken in the work detailed.—*Jour. Chem. Soc.*, May, 1888, 468–473.

VAPOR-DENSITY OF FERRIC CHLORIDE AT VARIOUS TEMPERATURES.

By W. Grunewald and V. Meyer.*

In these experiments, sublimed ferric chloride was used. The estimations were made in a slightly modified form of V. Meyer's apparatus, in which the bulb, 45 mm. in diameter, was reduced to a length of only 125 mm., whilst the whole apparatus was 670 mm. high; by this means the whole of the bulb acquired the temperature of the bath. For greater convenience in filling with nitrogen, a thin tube was fused into the bottom of the bulb, bent so as to follow the shape of the bulb and stem until the side tubes were nearly reached, then bent at right angles to connect with the nitrogen supply.

A new device of Meyer and Biltz for the introduction of the substance is also described: On the stem, opposite to, but just below the delivery tube, a short side tube is fused; through this passes a glass rod whose end projects across the stem; the joint between rod and side tube being made with well-fitting caoutchouc tubing. The little bottle containing the substance rests on the end of the rod; when the bulb has attained the required temperature the rod is slightly withdrawn, and the bottle falls into the bulb.

Four determinations at 448° (in sulphur vapor) gave a density of 10·487, whilst that required by the formula Fe_2Cl_6 is 11·2. After the estimation the contents of the bulb did not give the slightest reaction

* Ber. 21, 687—701, reprinted from "Jour. Chem. Soc.," May, 1888, p. 422.

for ferrous salt. Experiments at a lower temperature were out of the question, as even in these the vaporization was rather slow.

At 518° (in vapor of phosphorus pentasulphide), three experiments gave a vapor-density of 9·569; about $\frac{1}{10}$ of the iron was found to be in the ferrous condition after the estimation.

At 606° (in vapor of zinc chloride), in a smaller apparatus, six experiments gave a mean vapor-density of 8·383; about $\frac{1}{8}$ of the iron was in the ferrous state at the close.

The determinations at higher temperatures were effected in platinum apparatus heated in a Perrot's gas furnace. The mean of three estimations at about 750° gave a vapor-density of 5·406, whilst about $\frac{1}{3}$ of the iron was found to be in the ferrous state at the close of the experiments. At about 1050°, the numbers obtained for the density were 5·3 and 4·9; $\frac{1}{3}$ and $\frac{1}{2}$ of the iron being respectively found in the ferrous state. The results at 1300° were practically identical with those at 1050°. As it seemed probable that the lower results in the higher temperature experiments might be due to the action of the platinum on the ferric chloride, experiments were made in platinum apparatus at about 600°, but the results obtained were in agreement with those previously got in glass.

With regard to the amounts of ferrous salt observed at the end of the experiments, it must be remembered that this does not show the amount of dissociation that occurred at the temperature of the experiment, inasmuch as recombination occurs on cooling.

Experiments in a chlorine atmosphere at the temperature of boiling sulphur and boiling phosphorus pentasulphide respectively, gave practically the same results as those in an atmosphere of nitrogen.

From these results it follows that ferric chloride does not at any temperature show a vapor-density sufficiently high for the molecular formula Fe_2Cl_6, whilst at 750° and 1077° numbers were obtained not far removed from 5·6, the calculated vapor-density for the molecular formula $FeCl_3$.

Crude Sulpho Carbolic Acid as a Disinfectant.—Laplace, (*Deutsche medizinische Wochenschrift*, No. 7, 1888,) mixes sulphuric with an equal weight of crude carbolic acid (twenty-five per cent. in strength) which yields a blackish, syrupy liquid soluble in water. A four per cent. watery solution of this compound destroyed the virulence of anthrax in forty-eight hours. Creolin, is impotent in solutions of two per cent., to destroy anthrax; the acidified solutions of corrosive sublimimate (1 to 1000) are potent against anthrax, but are not so available in practice.

ANCIENT MATERIALS FOR PAPER MAKING.

It has been generally believed that linen rags have been used in the manufacture of paper only since the fourteenth century, and that previously to that the writing materials of the East were chiefly made from unmanufactured materials. This view must be considerably modified in consequence of a careful microscopical examination made by Dr. Julius Wiesner, of the paper from El-Faijûm preserved in the Austrian Museum at Vienna in the collection known as "Papyrus Erzherzog Rainer." Many of these papers extend to the ninth, and some are even as old as the eighth century. The papers are all "clayed" like modern papers.

Dr. Wiesner's examination gave the unexpected result that these papers were all manufactured from rags. The fibre is mainly linen among which are traces of cotton, hemp and of some animal fibre; well-preserved yarn threads are of very frequent occurrence. The manufacture of paper out of rags is not, therefore, as has hitherto been supposed, either a German or an Italian invention, but is an Eastern one. In addition to the Faijûm papers, he examined also more than five hundred Oriental and Eastern specimens from the ninth to the fifteenth century, not a single one of which was a raw-cotton paper; all were manufactured from rags, the chief ingredient being linen.

The examination of the substance used for "claying" gave equally unexpected results. In all the Faijûm papers this was found to be starch-paste, a substance which had been supposed not to have been used for this purpose before the present century; animal substances do not appear to have been employed for "claying" before the fourteenth or fifteenth century. In some instances well-preserved starch-grains were mingled with the paste; these agreed, in form and size of the grains, with wheat starch, and were evidently prepared starch separated from the meal. In two papers, belonging to the tenth and eleventh centuries, buckwheat-starch was found, and the cultivation of this substance must, therefore, be dated back to the tenth century. The object of the "claying" was apparently to increase the whiteness of the paper.—*Phar. Jour. and Trans.*, April 14, 1888.

Methalal (see Amer. Jour. Phar., 1887, pp. 19, 198, 267,) is regarded by Dr. H. Krafft as the best agent, when given hypoderimically, for producing sleep in delirium tremens, particularly in an anæmic condition of the patients.

NOTES ON IPECACUANHA WINE.[1]

By C. A. MacPherson.

The more important of previous publications on the subject were reviewed, and numerous experiments by the author himself were recorded in detail. First, referring to the nature of the extract of ipecacuanha which is obtained in the course of the pharmcopœial process, it was shown as the result of five experiments that the amount of the extract varies with the root employed. Thus, three specimens of root gave (1) 86, (2) 95½, and (3) 99 grains of the extract per oz. The first of these when used in finer powder (No. 40) gave 90¾ grains of extract; both, however, were nearly alike as to the percentage of matter insoluble in sherry—viz., 25·58 and 25·61. No. 2 extract contained 21·72 per cent. of insoluble matter, and No. 3, 23·74 per cent. Slight modification of the manner of percolating the drug was found to materially affect the nature of the extract.

The author then proceeded to show the result of percolating 8 oz. of the drug; the first 3½ oz. of percolate yielded 389¼ grains of extract, the next 7 oz. gave 34½ grains, the next 5 oz. 40 grains, other 6 fractions of 5 oz. each gave quantities diminishing from 10 grains to ⅜ grain. Still other ten fractions sufficient to make the whole gallon of percolate required by the Pharmacopœia were collected and evaporated, but the whole of them yielded only 5 grains of extract. Obviously the Pharmacopœia carries percolation to a ridiculous excess. Further tests showed that the bulk of the emetine was removed from the root by the first portions of the menstruum, and that the ipecacuanhic acid is not destroyed by heat of careful evaporation—viz., 150° Fahr. The pectin substance which is found in the extract is derived from the first portion (40 oz.) of the percolate, which also contains all the acetic acid used. As to evaporation, the author was of the opinion that it is advisable to evaporate each portion of the percolate by itself, and to stir frequently so as to facilitate the escape of the acid and water vapors.

The extract should be mixed with the wine by adding the latter gradually to the former contained in a mortar, and rubbing them together so as to diffuse the extract through the liquid in the finest pos-

[1] Abstract of a paper read before the North British Branch of the Pharmaceutical Society of Great Britain; reprinted from *The Chemist and Druggist*, March 31, 1888, p. 419.

sible state of division, otherwise knots are formed which resist the action of the solvent, and if not broken up must so far weaken the finished product.

The next point taken up by the author was the nature of the precipitate which is formed in ipecacuanha wine on keeping. On this point the opinions of Duckworth, Johnson, Brownen, and others were quoted, and criticised in detail, the object of the author being to show that there was a want of evidence as to the reputed alkaloidal nature of the deposit. It has been stated that the deposit is formed owing to the oxidation of the ipecacuanhic acid; also, that it is the result of a fermentative process. These are mere conjectures to a large extent. The author had examined the old and new wines and found that all the deposits were evidently alike except that the proportions of crystalline and non-crystalline matter were reversed, the crystalline predominating in that from the new wine. Under the microscope the crystals were seen to be prismatic, the primary form, so far as could be made out, being an octahedron. The non-crystalline portion was composed of what seemed to be minute yellowish granules (generally united) with larger mycelium-like pieces interspersed. A sherry deposit was found to resemble the ipecacuanha wine one. On examination chemically the crystals were found to be tartrate of lime, a little magnesia also being present in those from the new wine. No potash was found in either sample examined. An examination for emetine and ipecacuanhic acid gave negative results. Various substances were found, but none of them related apparently to the active constituents of ipecacuanha, the author summing up this portion of the paper by saying that the sherry is hardly responsible for the deposit, and it is probable that the remainder constituting the bulk of the non-crystalline matter is chiefly a substance belonging to the pictic series with a small proportion of fatty matter derived from the ipecacuanha.

The author then gave an account of several percolation experiments, in one of which water alone was used, instead of acetic acid and water, for exhausting the root. The watery percolate on evaporation yielded a brittle extract of a yellowish-brown color and bitter taste. With reagents it gave strong evidence of the presence of emetine and ipecacuanhic acid. Moistened with rectified spirit, it hardened, but dissolved in diluted spirit. It contained a large quantity of gummy matter, but it was noticeable that the wine made from the extract kept longer

bright and free from deposit than the official wine. In another experiment the author showed that if the 1867 wine is heated carefully to a temperature of 180° F. and set aside to cool, there slowly separates a a coagulum. Freed from this by filtration, the wine is obtained perfectly bright, and it remains in this condition for a long period.

GHATTI, AND OTHER INDIAN SUBSTITUTES FOR GUM ARABIC.[1]

By A. Mander.

A short time ago Mr. E. M. Holmes gave me some samples of Indian gums which have recently been imported in large quantities, and suggested an examination. The results I have obtained will perhaps not be altogether uninteresting to the members of this Association.

The packages were named "Glassy Amrad," "East India Amrad," "Pale Amrad," "Oomra Whatti," and "Ghatti," which will be briefly noticed *seriatim*.

Glassy amrad is a dark gum consisting of more or less rounded, and some stalactitic pieces, with smooth shining surface and free from internal cracks. Color varying from dark-brown to pale yellow.

With the proportion of distilled water directed for mucil. acaciæ, B. P. it completely dissolved, forming a tasteless mucilage of a dark yellowish-brown color, not gelatinous, but very viscid. By passing given volumes through a burette, and comparing the times required, the viscosity was found to be 2 (muc. acac. =1). This mucilage was strongly adhesive and readily emulsified oils, but the products were of a pale fawn color. A solution of borax gelatinized the mucilage; basic lead acetate caused a slight non-gelatinous precipitate, and dense white precipitates were formed on the addition of ammonium oxalate or alcohol; ferric chloride gave a brownish coloration.

East India Amrad.—A dark brittle gum of a reddish tint, composed chiefly of transparent angular fragments with a few rounded masses having a conchoidal fracture. When dissolved it gave a taste-

[1] From a paper read before the School of Pharmacy Students' Association; reprinted from *Pharm. Jour. and Trans.*, April 14, 1888, p. 876.

less mucilage, in color similar to that from glassy amrad, but viscosity only ·51 (mucil. acaciæ=1). Very adhesive, and formed a tinted emulsion with olive oil.

A brownish, opaque thick jelly was produced by basic lead acetate; there was no gelatinization by borax, and only slight cloudiness with ammonium oxalate; alcohol readily precipitated a diluted solution and ferric chloride slightly darkened another portion.

"Pale amrad" somewhat resembles "gum acacia sorts" being in broken angular pieces or small tears, and these more or less cracked internally—some pieces may be noticed having an opaline surface.

It forms a pale yellowish brown, slightly gelatinous, very fluid mucilage, viscosity being ·156. This is adhesive and emulsifies olive oil like the two previous gums, but with a product not quite so colored. A thick, curdy, opaque precipitate was given with basic lead acetate; slight precipitates were formed with neutral lead acetate and mercuric chloride; dense white with ammonium oxalate, and curdy white with both ferric chloride and alcohol.

Oomra Whatti.—A dark gum, in irregularly shaped and stalactiform pieces, clear internally but dull surface; color from reddish to pale yellow.

This gave a mucilage somewhat darker than glassy amrad, but of similar properties. Viscosity 1·8, adhesive, and emulsified oils easily. No precipitates were given with neutral or basic lead acetates, but white with ammonium oxalate or alcohol; borax gelatinized it, and ferric chloride caused darkish coloration.

Ghatti.—A pale gum consisting of rounded or vermiform pieces of varying size, clear internally, but dull and roughened on the surface, apparently caused by shrinkage in drying; from brownish-yellow to perfectly colorless and transparent. More carelessly picked than previous specimens, with woody and other foreign matter adhering.

With the same proportion of water as the other gums it formed a pale yellowish-brown semi-solid mass, very powerfully adhesive.

When diluted, the solution gave a translucent slightly gelatinous precipitate with basic lead acetate, was precipitated by alcohol, gelatinized by borax, but only a slight opalescence was produced with ammonium oxalate. By incineration, the gum yielded 2·55 per cent. of an ash consisting chiefly of potassium and calcium carbonates and traces of sulphate.

The behavior with chemical reagents is summarized in the following table:

	Glassy Amrad.	East India Amrad.	Pale Amrad.	Oomra Whatti.	Ghatti.
Basic lead acetate . . .	Slight ppt., not gelatinous.	Brownish opaque thick jelly.	Curdy opaque ppt.	No ppt.	Translucent gelatinous ppt.
Neutral lead acetate . .	. . . . .	. . . . .	Slight ppt.	. . . . .	
Ammonium oxalate . .	White ppt.	Slightly colored ppt.	White ppt.	White ppt.	Slight ppt.
Borax	Gelatinized	. . . . .	. . . . .	Gelatinized.	Gelatinized.
Ferric chloride	Brownish color.	Slight darkening.	Curdy white ppt.	Slight darkening.	
Mercuric chloride . . .	. . . . .	. . . . .	Slight ppt.	Slight ppt.	
Alcohol.	Ppt.	Ppt.	Ppt.	Ppt.	Ppt.

The oomra whatti and amrad gums cannot be said to have much value in practical pharmacy, though they may be well adapted for the chief uses to which the inferior qualities of gum arabic were formerly exclusively put. They contain little or no astringent principles to affect the mordants in calico printing, and for strong adhesive mucilages where color is immaterial "glassy amrad" and "oomra" seem to be very suitable. Concerning "ghatti" a little more must be said.

Another supply of mucilage was made according to the formula:

Gum ghatti.....1 ounce.
Distilled water.....3 fluid ounces.

On straining, a few grains were separated which had swollen to a translucent jelly, and these remained undissolved when treated with more water. The mucilage thus obtained is scarcely as bright as that from picked gum arabic, but quite equal to that given by ordinary good samples as to color, and at the same time more viscid. It is tasteless, inodorous, and of superior adhesive properties to mucil. acaciæ.

The emulsifying power was tried with olive oil, this being selected in preference to almond or castor oils as a more crucial test. Several emulsions were made with varying proportions of oil and ghatti mucilage as above, and some of these are open to comparison this evening with others made with the same amounts of oil and acacia mucilage prepared from selected gum.

No. 1.—Ghatti mucilage 1, olive oil 1, distilled water 62.
No. 2.—Acacia " 1, " 1, " " 62.
No. 3.—Ghatti " 1, " 2, " " 61.
No. 4.—Acacia " 1, " 2, " " 61.

It will be noted that the emulsions afforded by ghatti mucilage are,

as regards consistence, etc., quite equal to those by acacia, but preferable as to color, being of almost pure snowy whiteness. On microscopical examination the oil particles in the emulsion made with ghatti and two parts of oil appear as nearly as possible identical in size with those given by acacia and one part, or half the quantity, of oil.

After standing fifteen days the "ghatti" emulsions showed no separation of oil, and since the mucilage was made with double the proportion of water used for acacia it must be acknowledged that the emulsive power of the gum is very remarkable.

The prevention, or long delaying, of the chemical reaction between mercuric chloride and calcium hydrate in the presence of acacia mucilage is well known, and experiments were made to ascertain if ghatti also possessed this power. That it does so in a very striking degree is evident from the mixtures before you. A is quite clear, without any trace of precipitate, being made by adding a little diluted ghatti mucilage before the lime water; while B contains the same proportions of in gredients, but has the characteristic appearance of lotio hydrargyri flava, the mucilage being added after reaction had taken place.

I regret not having had opportunity to continue testing the properties of this gum, but from these facts it is evident that there is an article commercially obtainable at a low price which, though differing considerably in appearance from the Acaciæ Gummi of the Pharmacopœia, possesses in a marked degree many characters which have been supposed to be peculiar to it. If more care were taken in the gathering and selection there seems to be little doubt that picked qualities would speedily rise to considerable commercial value and pharmaceutical interest.

ASARONE.

By B. Rizza and A. Butlerow.*

In 1884 asarone was investigated by the authors (*Am. Jour. Phar.*, 1885, *p.* 354), and found to be an unsaturated compound, containing three methoxyl-groups. The molecular formula, $C_{12}H_{16}O_3$, was

* J. Russ. Chem. Soc., 1887, p .12; reprinted from Jour. Chem. Soc., 1888, p. 458.

ascribed to it. On oxidation it yielded a neutral, crystalline substance; this was subsequently investigated by Staats, and although his work confirms the author's results in general, the sample which he analyzed does not seem to have been pure.

In the present paper, the chemical nature of asarone is determined by the study of its products of oxidation, which are a neutral substance, an acid, and a compound derived from the latter by the elimination of a CO_2 group. Two methods are employed. In the first, the asarone (12 grams) is dissolved in strong acetic acid (40 grams) and potassium dichromate (6 grams) added; the mixture is then carefully heated until it turns green. On cooling and adding water, needle-shaped crystals separate together with a reddish-brown resinous substance. The crystals are neutral, of a silky lustre, soluble in hot water, ether, light petroleum, and benzene. They melt at 114°, but sublime even at 100°. The analysis agrees with the formula $C_{10}H_{12}O_4$. Better results are obtained by the use of potassium permanganate solution (40 grams in 750 grams water), which is added drop by drop to a warm solution of asarone (10 grams in 450 grams water). The compound $C_{10}H_{12}O_4$ is extracted from the filtrate by means of ether; the alkaline solution is then evaporated to dryness, and the residue either extracted with hot alcohol or decomposed with hydrochloric acid, and then extracted with alcohol. In the first case the potassium salt of a new acid separates out from the hot spirit, in the second the new acid itself. Carbonic, formic, oxalic, and acetic acids are formed at the same time. When the operation is conducted as described, the quantity of acid formed is much larger than that of the neutral substance, but the reverse is the case when a mixture of asarone (5 grams) and finely-powdered permanganate (7·5 grams) is added in small portions at a time to boiling water. The acid, $C_{10}H_{12}O_5$, crystallizes in needles, which are soluble in benzene, light petroleum, alcohol, and boiling water. It melts at 144°, and boils at about 300°; it has distinctly acid properties, decomposing carbonates. Its silver salt, prepared from the potassium salt, is tolerably stable under the influence of air and light.

The neutral substance, $C_{10}H_{12}O_4$, was found to be the aldehyde of the acid $C_{10}N_{12}O_5$, as was proved by the oxidizing it with permanganate, when it was converted into the acid. Neither of these substances, however, has the properties of an unsaturated compound so characteristically exhibited by asarone. That the neutral substance is an alde-

hyde is also proved by treating it with phenylhydrazine hydrochloride in the presence of sodium acetate, when yellow crystals are obtained, melting at 120—121°, and having the formula $C_{16}H_{18}O_3N_2$. By the action of sodium amalgam on the aldehyde, two new compounds are formed, one of which melts at 62°, the other at 102°. One of them seems to be the alcohol corresponding with the aldehyde, but they were not further investigated.

Three methoxyl-groups exist in asarone, and these are also present in the aldehyde and in the acid, as is shown by heating them with hydrochloric or hydrobromic acid, when methyl chloride or bromide is formed. It is best, however, to first heat the acid or aldehyde with four times its weight of slaked lime, whereby it is converted into an oily substance of the formula $C_9H_{12}O_3$ boiling at 245—247°; this, when heated with hydriodic acid in a sealed tube yields methyl iodide, corresponding in amount with three methoxyl-groups, from which it would appear that the constitution of this oil is $C_6H_3(OCH_3)_3$; that is, the trimethyl ether of a triatomic phenol. The presence of the benzene nucleus in asarone was proved by heating it with zinc-dust, and passing the products of distillation into strong nitric acid, when nitrobenzene was obtained.

The authors conclude from the study of the reactions of asarone and the allied compounds that their constitution may be expressed by the following formulæ: Asarone, $C_6H_2(OMe)_3 \cdot CH:CH \cdot CH_3$; asarone dibromide, $C_6H_2(OMe)_3 \cdot CHBr \cdot CHBr \cdot CH_3$; the aldehyde, $C_6H_2(OMe)_3 \cdot CHO$; the acid, $C_6H_2(OMe)_3 \cdot COOH$, and the oily substance by $C_6H_3(OMe)_3$. Without regard to the position of the single group in the benzene nucleus, a striking analogy exists between asarone, the aldehyde, and the acid from asarone, and anethoïl, $OMe \cdot C_6H_4 \cdot C_3H_5$, anisic aldehyde, $OMe \cdot C_6H_4 \cdot CHO$, and anisic acid, $OMe \cdot C_6H_4COOH$, on one side, and eugenyl methyl ether, $(OMe)_2 \cdot C_6H_3 \cdot C_3H_5$, vanilyl methyl ether, $(OMe)_2C_6H_3 \cdot CHO$, and veratric or dimethylresorcinic acid, $(OMe)_2C_6H_3 \cdot COOH$, on the other. The authors consider it a complicated task to determine the relative positions of the substituting groups. The acid and the trimethyl ether were treated with phosphorus pentachloride, hydriodic acid, and, lastly, with hydrochloric acid, but only in the last case was a satisfactory result obtained. The product crystallized from hot water in glistening needles, melting about 250°, decomposition and sublimation taking place at a much lower temperature. It dissolves in sulphuric acid, forming a blue,

and in nitric acid a green solution. With ferric chloride, the aqueous solution gives a black coloration, which in dilute solution becomes violet on adding a little sodium hydrogen carbonate. Its composition corresponds with the formula $C_{12}H_8O_4=2C_6H_3(OH)_3-2H_2O$, and it is to a certain degree analogous to phloroglucol.

TERPENES AND THEIR DERIVATIVES.[1]

By J. W. Brühl.

A comparative study of the chemical and physical properties of the terpenes. A table containing the boiling point, rotation, density d, refractive index for the C line n, specific refraction $\frac{n^2-1}{(n^2+2)d}$ and molecular refraction $\frac{n^2-1}{n^2-2}\frac{P}{d}$ (P being the molecular weight), of a number of the best known terpenes, has been compiled from the data of different observers. The terpenes are thus divided into eight groups, similar to those given by Wallach (Am. Jour. Phar., 1887, p. 619,) phellandrene and terpinene coming under the heading laurene, and menthene and sesquiterpene forming an extra group. These groups are:

1. *Citrene* (limonene), boiling point 172—179°, the differences probably due to impurities in the specimens examined. Dextro-rotatory. Sp. gr. 0·846. Refractive index 1·47. Specific refraction 0·328. Absorbs 2 mols. HCl, the resulting product being identical with the similar product from dipentene, and giving the latter and not citrene when the hydrogen chloride is removed by means of aniline. From this, and the formation of a tetrabromide melting at 104°, the presence of two unsaturated or double bonds is probable, as also from the molecular refraction which agrees closely with that calculated for such an unsaturated compound.

2. *Dipentene.*—Differs from the above only in being optically inactive and yielding a tetrabromide melting at 124°.

3. *Isopentene.*—Dextrorotatory, differs only slightly from the two former in physical properties.

4. *Sylvestrene.*—Has probably never been prepared in a state of

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[1] Berichte xxi., 145–179 and 457–477; reprinted from *Jour. Chem. Soc.*, April, 1888, p. 377, and May, p. 494.

purity, and does not appear to differ in any marked degree from the foregoing.

5. *Pinene.*—Boiling point 155—160°. Sp. gr. 0·859. Refractive index 1·463. Specific refraction 0·320. The molecular refraction is that of a compound containing one double bond. This agrees with the chemical evidence, as pinene combines with 2 mols. of bromine and 1 mol. HCl.

6. *Laurene and Menthene.*—Boiling point 173—175°. Lævorotatory. Resembles pinene in other respects.

7. *Camphene.*—Solid, melting at 47°; boils at 156—157°. The hydrogen chloride derivative is very unstable and is decomposed by water at ordinary temperatures; it is therefore probable that this is only a molecular compound, camphene containing no double bond, a view supported by its optical properties.

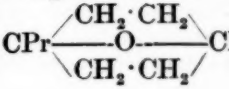
8. *Sesquiterpene,* $C_{15}H_{24}$.—Found in volatile oils associated with the terpenes. Boiling point 250—260°. Rotation differs for different varieties. From its optical and chemical properties appears to contain two double bonds.

The author regards the terpenes as derivatives of paracymene. Formulæ similar to those of Wallach (*loc. cit.*) are proposed for citrene, dipentene, pinene, and phellandrene, and a discussion of the various possible formulæ for the other terpenes is entered into.

In continuation of the author's first paper the oxygen-derivatives of the terpenes are discussed. The physical properties of these are arranged in a table similar to that given in the case of the terpenes.

Menthol, $C_{10}H_{20}O$, is probably a derivative of menthene, with which it occurs in peppermint oil. It is lævorotatory, and its molecular refraction shows that it contains no double bond, and that its oxygen is united by single affinities. It is a secondary alcohol, and on oxidation yields the dextrorotatory menthone, $C_{10}H_{18}O$, a ketone, the relation of which to menthol is similar to that of camphor, $C_{10}H_{16}O$, to borneol, $C_{10}H_{18}O$. By the action of hydrogen chloride, menthol is converted into the compound $C_{10}H_{19}Cl$. This, by loss of HCl, yields hydromenthene, $C_{10}H_{18}$, from the tetrabromide of which, by the removal of 4 mol. HBr, paracymene is obtained. Menthol is probably hydroxyhexahydroparacymene [Pr : OH = 1 : 3].

Cineol, $C_{10}H_{18}O$, contains neither hydroxyl nor carbonyl, and yields, by loss of water, dipentene and also paracymene. It can form very

unstable additive compounds, but according to its molecular refraction is a saturated compound. It is optically inactive, and optically inactive dipentene dihydrochloride is formed when hydrogen chloride is passed into warm cineole. Of the nine possible formulæ for cineole as a paracymene-derivative, only one, CPr  CMe, is in keeping with these facts.

Terpin, $C_{10}H_{20}O_2$, is an optically inactive compound, formed by the action of alcoholic nitric acid on pinene. It is a saturated compound, containing two hydroxyl-groups. By the action of hydrogen chloride on terpin, a compound, $C_{10}H_{18}Cl_2$, is formed, identical with the additive-product from dipentene and hydrogen chloride. Boiled with dilute mineral acids, terpin is first converted into terpineol, $C_{10}H_{18}O$, and then into dipentene. Terpineol contains one hydroxyl-group, has one double bond, and is optically active. In all probability terpin is a dihydroxy-, terpineol a monohydroxy-derivative of dipentene.

Camphor, $C_{10}H_{16}O$, is probably also a derivative of the terpenes and paracymene, as it is easily obtained from camphene. From the molecular refraction of ethylcamphor, it is concluded that camphor contains no double bond. Borneol, the secondary alcohol derived from camphor, is also a saturated compound. From bornyl chloride $C_{10}H_{17}Cl$, by elimination of HCl, camphene is obtained, so that borneol like camphor appears to be related to that terpene.

Isomeric with camphor are myristicol and absinthol. The first of these is an alcohol, and contains two double bonds. By the action of phosphorus chloride a compound $C_{10}H_{15}Cl$ is obtained, which on elimination of HCl yields paracymene. Myristicol is, therefore, probably a phenol of hydrated paracymene. Of absinthole but little is known; it is neither an aldehyde nor a ketone, but the oxygen is probably combined as in cineol.

Carvol and carvacrol, $C_{10}H_{14}O$. The molecular refraction is found to support Goldschmidt's views of the relation these substances bear to one another.

Safrol, $C_{10}H_{10}O$, contains according to the molecular refraction four double bonds, and from what is known of its chemical behavior has most probably the constitution $C_3H_5 \cdot C_6H_3 < \begin{matrix} O \\ O \end{matrix} > CH_2$. The recently discovered shikimol appears to be identical with safrol. Both are optically inactive.

CINCHONA CULTIVATION IN BOLIVIA.

By Dr. H. H. Rusby.

From a Lecture delivered at the Philadelphia College of Pharmacy December 1, 1887, stenographically reported by Dr. C. H. Morgan.

At about the time that the plants exported to India had begun to produce seeds, the native supply of South America had become exhausted, and those whose business had thus failed were obliged to invest their capital in the planting and culture of the trees. So it happens that at the present time no bark, except an occasional bale, reaches the market, which is not the product of cultivated trees. All the barks I show you here, with about three exceptions, are the product of cultivated trees. I had men out for two months, searching the forests for wild trees, and so scarce is it that I assure you I succeeded in obtaining only three.

This brings me to the subject of its cultivation. Regarding the selection of a site for the plantation, I have already covered the subject in speaking of the conditions of its growth. After a suitable place has been selected the land must be cleared. This is done by felling the trees, and cutting away the undergrowth and burning it during the season of dryness, which occurs in quite different months, in localities even quite near to one another. The clearing process is not so difficult here as upon the level ground, owing to the ease with which the trees can be made to fall. It often happens that these trees in falling will carry down immense tracts of forest with them. The place where the trees are planted is very steep. On such a place I have seen a tree weighted down with water, go crashing down to a point so far below us, that to reach that point by the road it would occupy an entire day, whereas the tree reached the bottom in a single instant, carrying with it, not only all the trees and vines in its way, but immense masses of rock and earth, an avalanche of vegetation blocking up the stream below. These trees will contain a very great amount of water. You will readily understand this when I explain to you that you seldom see a portion of the trunk, or larger branches of the tree as large as the palm of my hand. It is so completely covered by parasites. Upon a single tree you may count sometimes from fifty to one hundred different species of plants growing as parasites, so that the trunk of a tree, which might be three feet in diameter, becomes five feet in diameter. The branches which themselves are about as thick as a man's leg, become so large with the mass of vines and mosses by which they are covered, that a person could very easily make his bed upon one of them, and sleep without danger of falling.

Among this vegetation you will see that a great deal of moisture could be held, and when one of these trees gets loaded down with the rain it often falls with its own weight. The burning process is never complete owing to the only partial degree of dryness which can be secured, and the labor is performed amid great dangers due to the steepness of the land. A level loamy spot is selected for the nursery and here the seeds are planted. When the plants have from three to seven leaves they are transplanted, the varieties being selected with great care. The ground between the rows is kept very clean, the weeding being performed twice annually. The planting is usually done by contract, the contractor agreeing to charge for none but valuable varieties brought to a certain age. The mode of counting the trees is as follows: com-

missioners, mutually appointed, walk between the rows of trees, plucking a leaf from each one, which leaves are carried to the house and counted during the evening, those of worthless varieties being rejected, the surface and venation of the leaf constituting the crucial mark. The trees are then carefully attended to until the bark matures. So freely has the pollen been transported from tree to tree, that however fine the tree may be from which you gather your seeds you will obtain from those seeds trees of almost every variety known to that section; so freely do they hybridize with one another. Similar trees of the same age, growing together may mature several years apart, the difference of maturity being indicated by the peculiar scaliness of the bark. The markings are very simple and can be readily observed when I pass around these two specimens. I ask you in passing them to take both of them in your hands at once, for the sake of comparison. You will see the large specimen which I hold in my left hand has not only longitudinal fissures, but transverse cracks, this dividing of the bark resembling the tarsus of a fowl, and hence called by the natives by a term which signifies "chicken-legs." This which I hold in my right hand, which is in every respect as good a variety of bark as the other is younger, and you will see that instead of cracking transversely it wrinkles longitudinally. This mark can be seen in a young tree of good variety, or it may indicate an old tree of a worthless variety; the difference being that the worthless variety, however old, still preserves its smooth character, while the good variety takes on this roughness.

While you are looking at these two specimens, more or less of the same quality, you may look at this specimen from an old tree, of a worthless variety, which is perfectly smooth, and of a light color. This is a spurious bark. An experienced hand goes through the plantation as a marker, and indicates the trees to be cut. The cutter follows, makes an incision through the bark about three inches above the root, and another one two feet higher, connecting them by a longitudinal incision. The bark is then removed in quills, which reduce very greatly in size and about sixty per cent. in weight, in drying. The sections of bark that I show you are four feet in length. The bark of commerce is about one half the length of this. We will take the two barks which I show you here, and you can all see the thickness of the first specimen. That specimen is still left upon the wood, so it has not shrunk in drying. If it had been removed from the wood, and allowed to dry in the quill form it would have contracted in size so much as to have been as small as that which I show you here, if not smaller. After this first quill of bark is taken from the tree, it is felled, and similar quills cut from above, the smaller portions being shaved. Two or three shoots are allowed to grow from the stump, and when these are cut five or six more may be allowed to grow for the next crop, after which the ground is replanted. The cutting is done by contract, the price paid being from fifteen to thirty-five cents for one hundred pounds of green bark. Arrived at the drying sheds, it is spread upon long narrow stretchers and exposed to the sun. In a week or ten days it is dry, and is tied with strips of raw-hide into bales of from sixty to sixty-five pounds each. This is the shape in which they are transported. Sixty-five pounds is a load for a man, and two of these bales is a load for a mule. Men however, usually carry them over the worst stages because mules are not able to endure the journey. At the repacking centre it is closely packed to go over the sum-

mit of the mountains. Men are rarely used upon this stage of the journey. The entire transit of these mountains requires about eight or ten days, and covers an actual distance of two hundred and twenty-five miles, costing from fifteen to twenty cents per pound Bolivian currency. So you see these men, loaded down as they are by sixty five pounds weight, accomplish for a period of ten days about twenty-two miles per day, and this is up and down mountains whose steepness surpasses anything which we have in this country. It is perhaps pertinent to remark just at this point that the Indians themselves believe it would be impossible to accomplish these journeys but for the use of coca. I must say that from my own experience I believe such to be the case.

From here it has nearly three hundred miles to go before it can be shipped. On this part of the journey there is comparatively level ground and three hundred pounds is a load for a mule, and five cents per pound the cost. The entire cost of collecting, drying, and transporting to London, the bark under the most favorable circumstances is estimated at about twenty-five cents per pound, United States currency, leaving the balance of fifteen to twenty cents of the ordinary selling price to go towards the expenses of cultivation. I can say too, that from my own estimate I do not see how people can buy bark from Bolivia, bring it to this country and get from it an amount of quinine which would not pay for the actual cost of the bark laid down in New York, leaving out of account the entire cost of manufacture. I do not see how they can get enough alkaloid from it to pay the cost of the bark itself. It has led me often to wonder whether it is not true that quinine is gradually being manufactured synthetically. I know nothing about it, but otherwise I am unable to explain the cheapness of quinine at the present time.

You are all aware that in India the custom prevails of taking bark from one side of the Cinchona tree, and then mossing. Mossing is, as you know, practiced to keep out the rays of the sun. The result is that new bark grows under the moss. This bark is not only greater in weight than the bark originally taken from that place, but it is very often much richer in alkaloid. This has been tried in Bolivia, and it has been found to be impossible on account of the great cost, owing to the comparatively high price of labor. The cultivation of Cinchona in this region is somewhat easier than in foreign lands. The product is slightly richer, but the expense is much greater than in India, the transportation charges not only eating up all the profits, but actually leaving a deficit on shipments disposed of at forced sale.

Cinchona trees were formerly met with two or three times the thickness of a man's body and tall in proportion. The age of such trees must have been very great, for wild trees at twelve or fifteen years are scarcely as thick as the wrist. Cultivated trees, on the contrary, at six to nine years, are six to eight inches in diameter, and yield from three to six pounds of bark. The appearance of a cinchona plantation is always handsome, owing to the peculiar satiny lustre of the leaves on many of the trees, of a rich purple red. When in flower its appearance is perfectly enchanting. At such times these groves are the resort of myriads of humming birds of which many species are to be found. I collected eight species of humming birds from a single tree in an hour's time. The air is at times filled with the hum of these birds just as it would be here with a swarm of bees. I collected altogether thirty-five species of humming birds.

The bark at present exported from Bolivia is almost wholly the Cinchona Calisaya, or yellow bark.

I pass on to say the yield from these barks is very variable. The pure Calisaya yields about eight per cent. of total alkaloids. The cocola, a spurious bark, gives only a small fraction of one per cent. Between these extremes you have every grade of excellence.

Besides the bark the natives use the leaves and flowers. The leaves are said to be nearly inert, but infusions of the flowers produce excellent results. They also use the buds, from which they make a gelatinous mass and apply it to fresh wounds, which heal up by first intention.

PHARMACOPŒIA OF THE PHILADELPHIA HOSPITAL.

In the February and March numbers of the *American Journal of Pharmacy*, 1876, we reprinted the formulas then in use in the Philadelphia Hospital. Since then many new preparations have been introduced, and others more or less modified, and a new edition of this hospital pharmacopœia was recently issued, which we reproduce in the following:

AQUÆ.

(*Aromatic Diluents.*)

Aqua Anethi.—Dill Water. *B. P.*
Aqua Capsici.—Capsicum Water.
Aqua Carui.—Caraway Water.
Aqua Pimentæ.—Allspice Water. *B. P.*

Emulsio Olei Gaultheriæ.

Each teaspoonful contains:

Oil of Wintergreen	gtt. x.
Acacia	q. s.
Water	q. s. ad ℥j.

Dose: One to four teaspoonfuls.

Emulsio Olei Morrhuæ.

Each tablespoonful contains:

Cod Liver Oil	℥ij.
Oil of Wintergreen	gtt. i.
Oil of Peppermint	gtt. i.
Acacia	q. s.
Water	q. s. ad ℥iv.

Dose: Tablespoonful.

Emulsio Ol. Morrhuæ et Hypophos.

Cod Liver Oil	℥ii.
Oil of Sassafras	gtt. ij.
Calcium Hypophosph	gr. iij.
Sodium Hypophosph	gr. iij.
Acacia	q. s.
Water	q. s. ad ℥iv.

Dose: Tablespoonful.

Emulsio Ol. Morrhuæ et Lactophos.

Each tablespoonful contains:

Cod Liver Oil	℥ij.
Oil of Sassafras	gtt. ij.
Acacia	q. s.
Calcium Lactate	gr. viij.
Acid Phosphoric (U. S. P., 50 per cent.)	m. viij.
Water	q. s. ad ℥iv.

Dose: Tablespooful.

Emulsio Ol. Morrhuæ et Sod. Phos.

Each tablespoonful contains:

Cod Liver Oil	℥ij.
Oil of Sassafras	gtt. ij.
Acacia	q. s.
Sodium Phosphate	gr. viij.
Water	q. s. ad ℥iv.

Dose: Tablespoonful.

Emulsio Ol. Morrhuæ et Pruni virg.

Each tablespoonful contains:

Cod Liver Oil	℥ij.
Oil of Sassafras	gtt. ij
Fl. Ext. of Wild Cherry	m. xxx.
Acacia	q. s.
Water	q. s. ad ℥iv

Dose: Tablespoonful.

Emulsio Ol. Morrhuæ et Quassiæ.

Each tablespoonful contains

Cod Liver Oil	℥ij.

Oil of Sassafras ..... gtt. ij.
Tr. of Quassia..... ..... m. x.
Tr. of Capsicum..... m. v.
Acacia..... q. s.
Water.....q. s. ad ƒ℥iv.
Dose: Tablespoonful.

Emulsio Olei Ricini.

Each tablespoonful contains:
Castor Oil ..... ƒ℥ij.
Oil of Sassafras..... gtt. ij.
Acacia..... q. s.
Water..... q. s. ad ƒ℥iv.
Dose: One or more tablespoonfuls.

Glyceritum Acidi Gallici. U. S. P. 1870.

Glyceritum Acidi Tannici. U. S. P. 1870.

Glyceritum Ferri.

Tr. of Ferric Chloride..... m. cxx.
Glycerin..... q. s. ƒ℥j.

Glyceritum Iodi.

Compound Solution of Iodine.
Glycerin..... āā. ƒ℥iv.
Epis. Hospital.

Glyceritum Olei Ricini.

Each tablespoonful contains:
Castor Oil,
Glycerin..... āā. ƒ℥ii.
Oil of Cinnamon..... gtt. ij.
Dose: Tablespoonful.

Glyceritum Sodii Boratis. U. S. P. 1870

Linimentum Aconiti.

Tr. of Aconite..... ƒ℥vi.
Chloroform..... ƒ℥iv.
Spts. of Camphor..... ƒ℥iss.
Soap Liniment.....q. s. ad ƒ℥vj.
Long Island Hospital,

Linimentum Ammoniæ.

Ammonia Water (17.5 per cent.)
..... ƒ℥ij.
Oil of Flaxseed.....q. s. ad ƒ℥vj.

Linimentum Arnicæ Comp.

Tr. of Arnica
Green Soap Liniment.
Alcohol.....āā. q. s. ad ƒ℥vj.

Linimentum Chloroformi Comp.

Chloroform..... ƒ℥i.
Tr. of Aconite,
Water of Ammonia..... āā. ƒ℥ss.
Oil of Flaxseed..... q. s. ad ƒ℥vj.

Linimentum Olei Succini.

Oil of Amber..... ƒ℥j.
Oil of Olive.....q. s. ad ƒ℥vi.

Linimentum Saponis Viridis.

Spirits of Camphor..... ƒ℥ij.
Tr. of Green Soap..... ƒ℥ij.
Oil of Sassafras..... gtt. xxx.
Alcohol..... ƒ℥ij.
Water..... q. s. ad ƒ℥vj.

Linimentum Terebinthinæ.

Oil of Turpentine..... ƒ℥vj.
Tr. of Capsicum..... ƒ℥iv.
Oil of Flaxseed..... ƒ℥ij.
Lime water..... q. s. ad ƒ℥vj.

Linimentum Terebinth. Co.

Oil of Turpentine,
Water of Ammonia (17.5 per cent.)..... āā. ƒ℥j.
Soap Liniment..... q. s. ad ƒ℥vj.

Liquor Acidi Carbolici.

(1–60, 1–50, 1–40, 1–30, 1–20).

Liquor Acidi Borici.

Boric Acid..... gr. xvj.
Rose Water..... ƒ℥j.

Liquor Acidi Tannici.

Tannic Acid..... gr. xvj.
Distilled Water..... ƒ℥j.

Liquor Acidi Phosphorici Co.

Each teaspoonful contains:
Potassium Phosphate..... gr. iss.
Magnesium Phosphate..... gr. ij.
Calcium Phosphate..... gr. iij.
Phosphoric Acid (50 per cent.)..... m. v.
Water .....q. s. ad ƒ℥j.
Dose: One to two teaspoonfuls.
Pepper.

Liquor Antisepticus.

Menthol ..... gr. iij.
Thymol ..... gr. viij.

Boric Acid..... gr. xxx.
Sodium Benzoate.....
Sodium Salicylate..... āā gr. xlv.
Oil of Gaultheria..... gtt. vj.
Oil of Eucalyptus..... gtt. xviij.
Glycerin..... ʒiv.
Alcohol..... ʒij.
Water..... q. s. ad ʒvj.
Use locally, well diluted with water

Liquor Cinchoninæ.

Each teaspoonful contains:
Cinchonine Sulphate..... gr. v.
Dil. Hydrochloric Acid..... q. s.
Water..... q. s. ad ʒj.
Dose: One to four teaspoonfuls.

Liquor Dobelli.

Sodium Bicarbonate.....
Borax..... āā. gr. xx.
Carbolic Acid..... gtt. vj.
Tr. of Opium..... ʒj.
Glycerin..... ʒvj.
Water..... q. s. ad ʒvi.
Dobell.

Liquor Hydrarg. Chlor. Corros.

(1-3000, 1-2000, 1-1500, 1-1200, 1-1000, 1-500.)

Liquor Potassii Permang., U.S.P. (1870).

Liquor Quinidinæ.

Each teaspoonful contains:
Quinidine Sulphate..... gr. ijss.
Dil. Hydrochloric Acid..... q. s.
Water..... q. s. ad ʒj
Dose: One to four teaspoonfuls.

Liquor Zinci et Aluminis.

Sulphate of Zinc.....
Powdered Alum..... āā. gr. xij.
Water..... ʒvj.
Episcopal Hospital.

Liquor Zinci Sulphidis.

Sulphurated Patassa.....
Zinc Sulphate..... āā. gr. xxiv.
Alcohol..... ʒiv.
Rose Water..... q. s. ad ʒvj.
Duhring.

Lotio Acidi Sulphurosi.

Sulphurous Acid..... ʒiv.
Water..... q. s. ad ʒij.
Roosevelt Hospital.

Lotio Calaminæ.

Calamine..... ʒiv.
Zinc Oxide..... ʒij.
Glycerin..... ʒij.
Rose Water..... q. s. ad ʒvi.
Tilbury Fox.

Lotio Cocculi Indici.

Fish Berries..... ʒvj.
Diluted Alcohol..... q. s. ad ʒvj.

Lotio Flava. B. P.

Lotio Nigra. B. P.

Lotio Pagliari.—Pagliari's Styptic.

Benzoin..... gr. xxx.
Alum..... ʒix.
Water..... q. s. ad ʒvj.
Boil for 6 hours, replacing water lost by evaporation, and filter.
Pagliari.

Lotio Picis Alkalina.

Potass. Hydrate..... ʒj.
Pine Tar..... ʒij.
Distilled Water..... q. s. ad ʒj.
Bulkley.

Lotio Plumbi Subacet. et Opii.

Tincture of Opium..... ʒiij.—ʒj.
Lead Water..... q. s. ad ʒvj.—0j.

Lotio Rubra.

Zinc Sulphate..... gr. xv.
Tr. of Lavand. Co..... ʒiss.
Water..... q. s. ad ʒvj.
N. Y. Hospital.

Lotio Sodæ Chloratæ.

Sol. of Chlorinated Soda..... ʒiij.—ʒj
Water..... q. s. ad ʒvj.—0j.
Boston Hospital.

Lotio Sodæ Chlor. et. Opii.

Tincture of Opium..... ʒiij.—ʒj.
Sol. of Chlorinated Soda..... ʒvj.—ʒij.
Water..... q. s. ad ʒvj.—0j.
Boston Hospital.

Lotio Sodii Hyposulph.

Sodium Hyposulphite..... ʒiss.
Water..... q. s. ad ʒvj.

Lotio Styptica.

Potassium Carbonate..... ℥iss.
Soap..... ℥iij.
Alcohol.....q. s. ad ƒ℥vj.
Pancoast.

Mistura Alterans Comp.

Each teaspoonful contains:
Tr. of Prickly Ash..... m. x.
Fl. Ext. of Lappa Minor..... m. xv.
Fl. Ext. of Phytolacca..... m. xv.
Fl. Ext. of Stillingia..... m. xv.
Fl. Ext. of Sarsap. Co.. q. s. ad ƒ℥j.
Dose: Teaspoonful.

Mistura Ammonii Carbonatis.

Each tablespoonful contains:
Ammon. Carbonate..... gr. x.
Mucilage of Acacia..... ƒ℥j.
Oil of Sassafras..... gtt. j.
Oil of Teaberry..... gtt. j.
Peppermint Water..... q. s. ad ƒ℥iv.
Dose: Tablespoonful.

Mistura Anticolica.

Each teaspoonful contains:
Tr. of Opium,
Tr, of Rhubarb,
Spts. of Peppermint,
Spts. of Camphor,
Spts. of Chloroform,
Tr. of Capsicum..... āā m. v.
Tr. of Catechu Comp....q. s. ad ƒ℥j.
Dose: Teaspoonful.
Germantown Hospital.

Mistura Antifebrilis.

Each tablespoonful contains:
Morphine Acetate..... gr. ⅛
Diluted Acetic Acid..... m. v.
Tr. of Aconite..... m. iss. (=gtt. iij.)
Spts. of Nitrous Ether.....
Syrup of Lemon..... āā ƒ℥j.
Sol. of Ammon. Acet...q. s. ad ƒ℥iv.
Dose: Tablespoonful.

Mistura Aromatica.

Each tablespoonful contains:
Coriander.....
Angelica..... āā gr. v.
Glycerin..... m. xv.
Syrup of Orange..... ƒ℥i.
Dil. Alcohol.....q. s. ad ƒ℥iv.
Use: Flavoring vehicle.

Mistura Arsenicalis Comp.

Each teaspoonful contains:
Strychnine Sulphate..... gr. 1/40
Cinchonine Sulphate..... gr. ijss.
Sol. of Arsenious Acid..... m. ijss.
Tr. of Ferric Chloride..... m. vijss.
Syrup.....
Water..... āā q. s. ad ƒ℥j.
Dose: One to two teaspoonfuls.

Mistura Astringens.

Each tablespoonful contains:
Tr. of Opium..... m. viiss.
Ext. of Logwood..... gr. x.
Aromat. Sulphur. Acid..... m. v.
Cinnamon Water.....
Syrup of Ginger.....āā q. s. ad ƒ℥iv.
Dose: Tablespoonful.

Mistura Bromida.

Each teaspoonful contains:
Sodium Bromide.....
Ammon. Bromide..... āā gr. ijss.
Potassium Bromide ..... gr. v.
Syrup of Orange..... m. xv.
Water.....q. s. ad ƒ℥j
Dose: One to four teaspoonfuls.

Mistura Camphoræ.

Each tablespoonful contains:
Deod. Tr. of Opium..... m. v.
Nitrous Acid..... m. iv.
Camphor Water.....q. s. ad ƒ℥iv.
Dose: Tablespoonful. Hope.

Mistura Chloroformi Comp.

Each teaspoonful contains:
Chloroform.....m. ijss (=gtt. x.).
Tr. of Capsicum,
Camph. Tr. of Opium,
Comp. Tr. of Catechu.....
..... āā. q. s. ad ƒ℥j.
Dose: Teaspoonful. Squibb.

Mistura Cretæ Comp.

Each tablespoonful contains:
Tr. of Catechu..... m. xxx.
Camph. Tr. of Opium..... ƒ℥i.
Beechwood Creasote..... gtt. i.
Chalk Mixture.....q. s. ad ƒ℥iv.
Dose: Tablespoonful.

Mistura Cubebæ.

Two teaspoonfuls contain:

Oleoresin of Cubeb	m. x.
Potassium Bromide	gr. x.
Syrup of Acacia	m. xlv.
Oil of Sassafras	gtt. ss.
Water	q. s. ad ƒʒ ii.

Dose: Two teaspoonfuls.

J. Wm. White.

Mistura Diuretica.

Two teaspoonfuls contain:

Potassium Nitrate	gr. v.
Potassium Acetate	gr. x.
Spts. of Nitrous Ether	m xv
Sol. of Ammon. Acet.	ƒʒ i.
Syr. of Lemon	q. s. ad ƒʒ ii.

Dose: Two teaspoonfuls.

Germantown Hospital.

Mistura Emmenagoga.

Each tablespoonful contains:

Tr. of Cantharides	m. v.
Tr. of Ferric Chloride	m. x.
Tr. of Aloes	m. xx.
Tr. of Guaiac Ammon.	ƒʒ j.
Syrup	q. s. ad ƒʒ iv.

Dose: Tablespoonful.

Dewees.

Mistura Expectorans.

Two teaspoonfuls contain:

Dil. Hydrocyanic Acid	m. j.
Spts. of Chloroform	m. v.
Hydrobromic Acid (34 per cent.)	m. vijss.
Syr. of Senega	m. xv.
Syr. of Squill	m. xv.
Syr. of Wild Cherry	q. s. ad ƒʒ ij.

Dose: Two teaspoonfuls.

Mistura Ferri Aperiens.

Each tablespoonful contains:

Ferrous Sulphate	gr. j.
Magnesium Sulphate	gr. xlv.
Dil. Sulphuric Acid	m. vijss.
Inf. of Quassia	q. s. ad ƒʒ iv.

Dose: Tablespoonful.

University Hospital.

Mistura Ferri et Ammonii Acetatis.

Each tablespoonful contains:

Tr. of Ferric Chloride	m. x.
Diluted Acetic Acid	m. xv.
Solution of Ammon. Acet.	ƒʒ ij
Elixir of Orange	
Syrup	āā q. s. ad ƒʒ iv.

Dose: Tablespoonful. Bashman.

Mistura Ferri et Potassii Citratis.

Each tablespoonful contains:

Tr. of Ferric Chloride	m. x.
Citric Acid	gr. v.
Glycerin	m. xxx.
Syrup	ƒʒ j.
Sol. of Pot. Cit.	q. s. ad ƒʒ iv

Dose: Tablespoonful, diluted.

Mistura Ferri et Potassii Tartratis.

Two teaspoonfuls contain:

Tartrate of Iron and Potassium	gr. v.
Glycerin	
Syrup	āā m. xxx.
Peppermint Water	q. s. ad ƒʒ ij

Dose: Two teaspoonfuls.

Mistura Ferri et Quininæ Citratis.

Two teaspoonfuls contain:

Cirate of Iron and Quinine	gr. v.
Syrup	
Glycerin	āā m. xxx.
Peppermint Water	q. s ad ƒʒ ij.

Dose: Two teaspoonfuls.

Mistura Ferri Pyrophosphatis.

Two teaspoonfuls contain:

Iron Pyrophosphate	gr. ijss.
Syrup	
Glycerin	āā m. xxx.
Peppermint Water	q. s. ad ƒʒ ij.

Does: Two to four teaspoonfuls.

Mistura Ferri et Quin. Phos.

Each tablespoonful contains:

Quinine Sulphate	gr. ijss.
Diluted Phos. Acid	q. s.
Iron Pyrophosphate	gr. ijss.
Glycerin	m. xxx.
Aromatic Mixture	
Water	āā q. s. ad ƒʒ iv.

Dose: Tablespoonful.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, May 15th, 1888.

The eighth and last of the present series of Pharmaceutical Meetings was held to-day—Mr. Wallace Procter being asked to preside.

The minutes of the last meeting were read and approved.

Specimens of *Sulphur* from the Cove Creek sulphur-bed, in Beaver county, Utah, were presented to the Cabinet of the College by Harry C. Myers, of Cleveland, Ohio, who stated that some specimens of the mineral contained as much as 93 per cent. of pure sulphur. The sulphur is extracted by putting the ore into cylinders and passing steam into them, the slag being supported on a grating, which rests upon kettles receiving the melted sulphur, and from thence it is drawn off. The works have a capacity of over 3,000 tons per annum; so far, however, 1200 tons is the most yet attained in one year.

Mr. England called attention to a formula for a *tasteless extract of cascara sagrada*, made by exhausting the drug and treating it with magnesium carbonate. He stated that he had made experiments in the same direction, modifying the taste by means of alkalies, and found it made a very much handsomer syrup, that could be mixed with aqueous menstrua without precipitation, and withal was quite a beautiful preparation. But the fluid extract administered in four times the usual dose of a fluid extract made without the use of alkalies, was found to be inert. For this reason he called attention to the formula, to guard others from its employment. He said he thought that the value of cascara sagrada depended upon an acid principle, that promoted the peristaltic movement of the bowels, and thus was efficient as a cathartic.

Mr. England read a paper upon *Theine Hydrobromate Elixir*. The reading of the paper elicited considerable discussion about the salts of caffeine and theine. It was stated that several prices current quoted them as one and the same thing, and that orders for caffeine and caffeine citrate were supplied indiscriminately from the same stock. The paper was referred to the committee on publication.

Mr. Procter referred to the *Tincture of Strophanthus*. He made the tincture by treating 29 grams of the seeds, deprived of their awns, and after thoroughly bruising them, with stronger ether (100 grams being used; this was recovered by careful distillation); the seeds, were then dried and percolated with alcohol, U. S. P., until 580 grams were obtained. The ether extracted 8.7 grams of dark fixed oil, which is possessed of some bitterness, but apparently does not contain much of the active principle. The tincture thus made cost $1.35 per pound, the ether not being charged, as it is almost entirely recovered at a low temperature, and had little or none of the characteristics of the strophanthus.

Several inquiries were made, whether petroleum spirit would not be a better material to remove the fixed oil. Mr. Beringer's experience was that ether was not so good as the petroleum spirit, as there was more danger of removing alkaloidal matter by ether than by petroleum, as the fatty matter associated with the other ingredients in the plants rendered the active constituents more soluble than they would be if not so associated.

Mr. Moerk stated that Dragendorff, in his work upon plant analysis, laid great stress upon the use of petroleum spirit to remove fixed oily matters in operating upon plants.

The tincture of strophanthus is used for a heart tonic, being regarded as supe-

rior to digitalis, and does not possess the diuretic power that belongs to the latter drug; it was used in varying doses of from two to seven drops, and had been used in cholera in doses as great as twenty drops.

Mr. Beringer read a paper in which he discussed the propriety of *introducing elixirs* as a class *into the pharmacopœia;* showing that there was considerable demand for them and that the pharmacopœia should be the authority when a preparation or class of preparations became so important as to be one-twentieth of the prescriptions written. The paper induced a discussion as to the best method of preparing elixir of cinchona, whether from the bark itself or from a mixture of the associated alkaloids; the general opinion was that the elixir prepared from the alkaloids was preferable to that made from the bark. It was argued that as bark derived from East India was much used and sometimes gave the large yield of seven and a half per cent. of total alkaloids it was right that a higher grade of cinchona should be demanded by the pharmacopœia.

Mr. Beringer exhibited a sample of *linseed oil*, so called, but certain peculiarities made him suspect it and after saponification he found nearly fifty per cent. of mineral oil had been mixed in it.

There being no further business on motion adjourned.

T. S. WIEGAND, *Registrar.*

EDITORIAL DEPARTMENT.

REVISION OF THE U. S. PHARMACOPŒIA.—Within two years from the present time the convention for the revision of the pharmacopœia will meet in Washington, and it is expected that the medical and pharmaceutical societies interested in this work will then be able to present the results of their own deliberations in a manner to render it available for the Committee of Revision, which will be charged with the issuing of the next edition. A committee has been appointed by the Philadelphia College of Pharmacy for the preliminary revision of the work, and is now actively engaged in it.

The Committee of Revision and Publication appointed in 1880 has determined to compile from the literature which has appeared since the publication of the pharmacopœia in 1882, a report on all subjects likely to be of practical use in the preparation of the next pharmacopœia; also to collect reliable statistics regarding the frequency with which the various articles, recognized in the present pharmacopœia, are prescribed or legitimately used. It is more particularly in regard to the latter that the State Pharmaceutical Associations may be instrumental in collecting valuable material for the next revision. With this end in view, the committee has published an alphabetical list of all pharmacopœial titles, and copies of this list may be obtained from the chairman, Dr. Charles Rice, Bellevue Hospital, New York, for about $6.75 per 100 copies. The plan proposed is that the State Associations collect such statistics for a definite period from different localities, through individuals or local associations, and that, from these reports, a general report for the entire State be compiled, and sent to the chairman of the Committee of Revision on or before January first next. If the State Associations act promptly in this matter, the next Committee of Revision will be able to intelligently decide which of the present pharmacopœial articles should be retained, and which should be dropped. It is obvious that in a similar manner statistics may also be collected of such drugs, preparations and chemicals which are not contained in the pharmacopœia, but are prescribed by physicians.

The subject of weights and measures, which has been so frequently discussed during the past twenty years, has evidently not been finally settled; it should receive the attention of each State Pharmaceutical Association, and the views

of its members, or of the majority of the same, should be clearly stated, so that the convention of 1890 may take proper action on this question.

The National Formulary which has been in preparation by a committee of the American Pharmaceutical Association, was completed during the past month, and the printing of it is about finished. It is now in the hands of the binder, and will be ready for distribution during the last week of June. It will be sent by mail to the members entitled to it, and will be for sale by the acting authorized agents in the different cities, and by the Permanent Secretary. The Publishing Committee have now under consideration the price at which it is to be sold, and which is to be as low as possible. Booksellers and wholesale druggists may likewise procure the book to supply their customers. The book will be bound in cloth, in cloth and interleaved, in cloth with raised nails, and in sheep.

Fire at the University of Pennsylvania.—At about eight o'clock in the morning of May 31st, fire was discovered in the building occupied by the medical department of the University of Pennsylvania, and although the firemen responded promptly to the alarm, considerable damage by fire and water was done to the building and to the various collections. The money value of the property destroyed is estimated to exceed $50,000; but many of the specimens damaged or destroyed can never be replaced, or only gradually by the expenditure of much labor. The Stillé library containing about 3000 volumes of rare medical works, was considerably damaged. Dr. Henry F. Formad, in charge of the pathological laboratory, lost all his private collections, instruments, etc.; and Professors D. Hayes Agnew, Joseph Leidy and others had their private laboratories and cabinets more or less damaged or destroyed. The faculty of the Jefferson Medical College promptly expressed their sympathy, and offered the University the use of their museum and library.

OBITUARY.

Alfred Tatem died in Philadelphia on February 17th, in the 69th year of his age. He learned the drug business with the late Messrs. Jordan & Anderson at 3rd & Walnut sts., in 1838, and from that time until his death he was devoted to his profession. The deceased was for a short time with Mr. Charles Shivers, at 7th & Spruce sts. He established himself in business at 11th & Vine sts., where he remained until 1848 when he removed to 15th & Locust sts. During the last forty years his close attention to store duties, although detrimental to his health, enabled him to secure the confidence of a large patronage. His death was caused by pneumonia, after a sickness of only two days. Mr. Tatem was a member of this College and also having been elected to the Trade Association of Druggists.

Gustavus J. Luhn, a prominent pharmacist of Charleston, S. C., died in that city April 4th, 1888, in the 49th year of his age. He was born in Saxony, came to the United States in 1847, and in 1868 established himself in Charleston. He was one of the originators and a very efficient member of the South Carolina Pharmaceutical Association, and for a number of years served on the Pharmaceutical Examining Board of that state. In 1878–79 he was president of the American Pharmaceutical Association.

Hartwell Harrison Pritchett, Ph. G., class 1886, was born in Greene county, Va., August 19, 1864, and died at the residence of his mother in Petersburg, Va., Feb 18, 1888. He was the son of a clergyman and received a good education. After serving an apprenticeship at the drug business he attended the Philadelphia College of Pharmacy in 1883–84. An injury to his left leg, received in childhood, now caused him much suffering and necessitated an operation by Professor Gross for necrosis of the bone. He returned to Philadelphia in 1885 and graduated with honor in the following spring.

J. Adam Weigner, Ph. G., class 1873, died at Lower Slatington, Pa., April 17, 1888, of consumption, at the age of 36 years. He was born near Bath, Pa., and since 1883 was in business at Slatington.